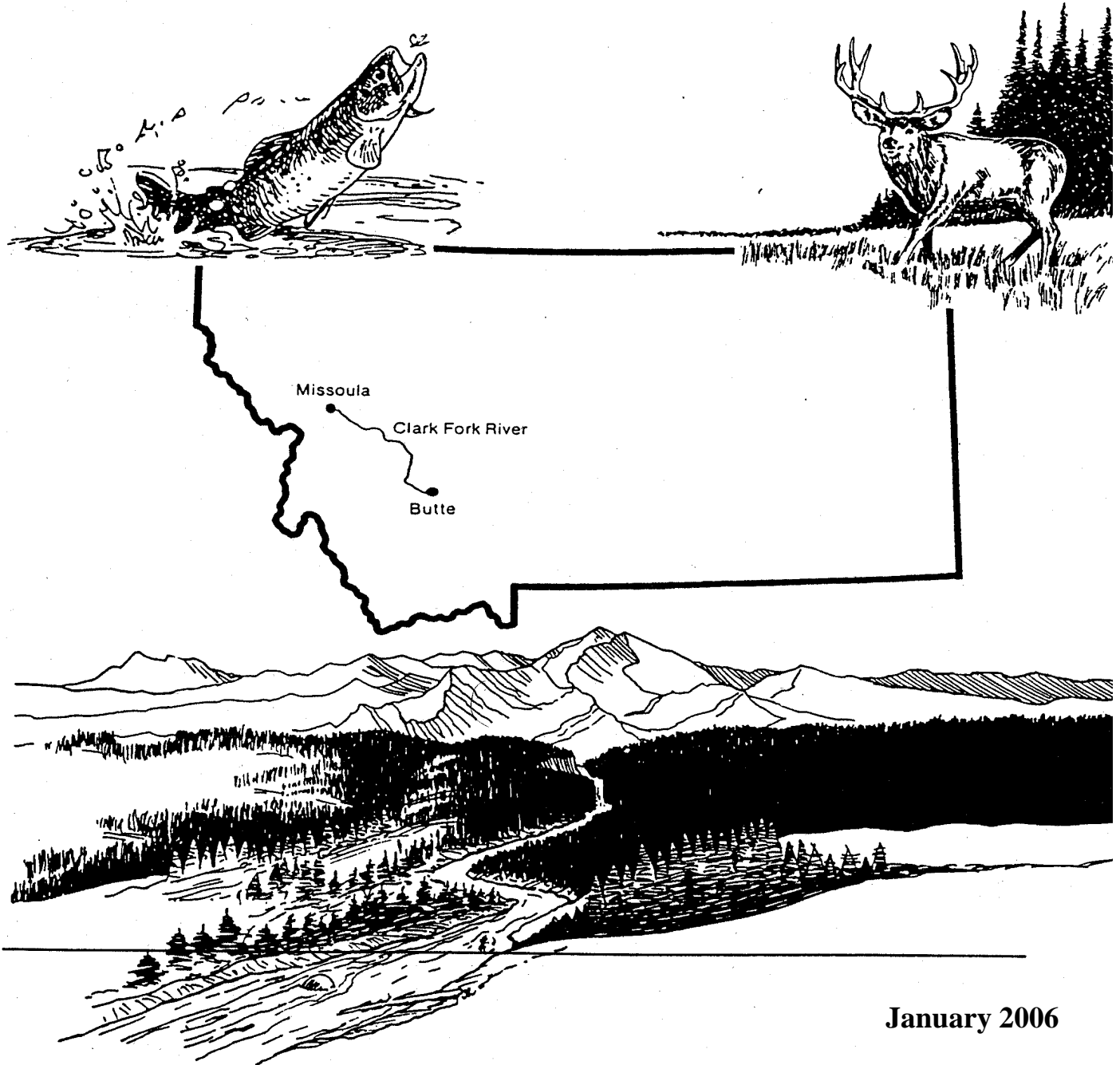


UPPER CLARK FORK RIVER BASIN RESTORATION PLAN PROCEDURES AND CRITERIA



January 2006

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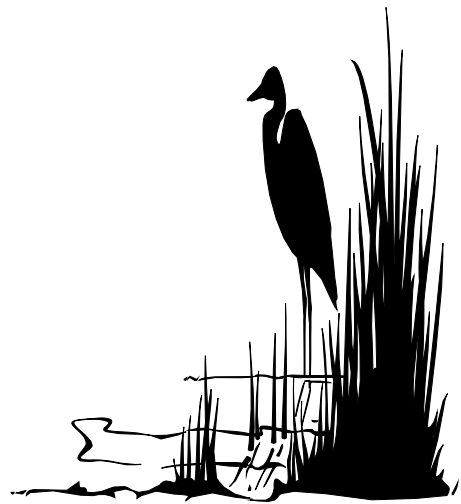
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CHAPTER 1

INTRODUCTION AND BACKGROUND



Chapter 1

INTRODUCTION AND BACKGROUND

This *Upper Clark Fork River Basin Restoration Plan Procedures and Criteria (RPPC)* describes the procedures and criteria the State of Montana will use to make decisions regarding the expenditure of damages recovered by the State as a result of a partial settlement of its natural resource damage lawsuit against the Atlantic Richfield Company (ARCO). The State received about \$130 million, including interest, specifically to restore, replace, rehabilitate or acquire the equivalent of the natural resources that were injured by hazardous substances as a result of decades of mining and smelting in the Upper Clark Fork River Basin (UCFRB).

The *RPPC* is organized as follows:

- Chapter 1 discusses the law pertaining to the recovery of natural resource damages and describes the State's natural resource damage lawsuit and settlements to date.
- Chapter 2 describes the natural resource injuries that have occurred in the UCFRB as a result of releases of hazardous substances by ARCO and its predecessors.
- Chapter 3 describes how the restoration funding process will work, who may submit applications for funding and who will make decisions about expenditures.
- Chapter 4 identifies the criteria that the State will apply in making restoration projects and funding decisions.
- Chapter 5 discusses the types and categories of restoration actions eligible for funding.

This is the second, revised version of the *RPPC*. The *RPPC* was originally published in February 2000 and it was revised in March 2002. Significant changes to the *RPPC* are subject to public notice and comment before the Governor finally considers them for adoption. The State solicited public comment on two sets of proposed changes to the 2002 *RPPC* in January 2005 and September 2005. Subsequently, the State revised that draft and adopted its present form.

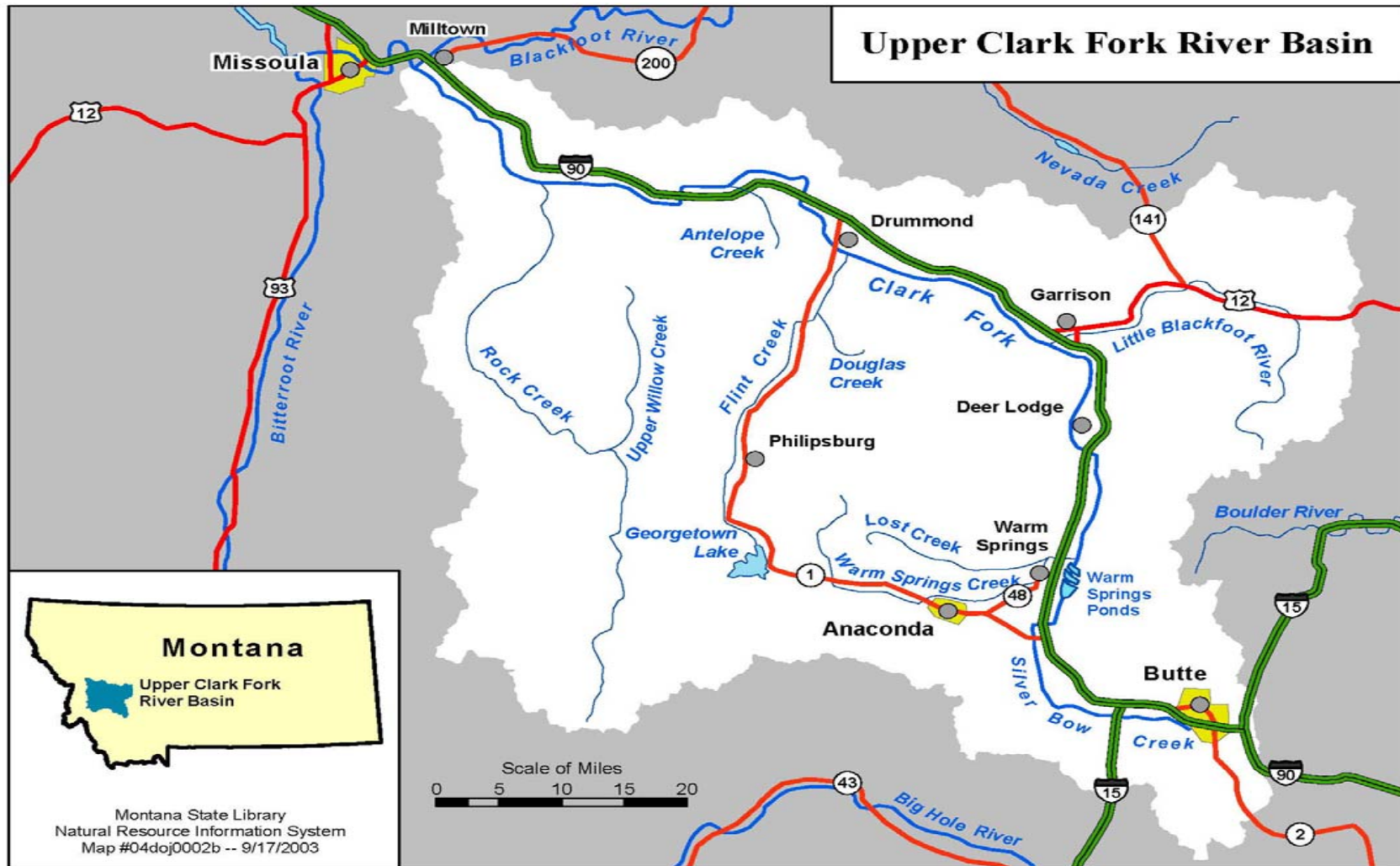
THE UPPER CLARK FORK RIVER BASIN

As used in this *Restoration Plan Procedures and Criteria*, the Upper Clark Fork River Basin refers to that portion of the watershed of the Clark Fork River extending from its headwaters, surrounding the city of Butte, downstream to Milltown Reservoir just upstream of the city of Missoula (see Figure 1). As used in this *RPPC*, the UCFRB includes Milltown Reservoir and Dam but does not include the Big Blackfoot River watershed. The Continental Divide serves as a border for the Upper Basin in its southernmost reaches and along its eastern edge, with elevations topping out at over 10,000 feet. The Basin lies in a typical inter-montane western landscape comprised of valleys, uplands, alpine areas, and their associated watersheds.

Silver Bow Creek, a headwater tributary of the Clark Fork River, flows in a westerly direction through Summit Valley into a canyon and onto the floor of the Deer Lodge Valley where it empties into the Warm Springs Ponds. The mainstem of the Clark Fork River begins immediately below the Ponds at the confluence of the Mill-Willow bypass, which receives the Ponds discharge, and Warm Springs Creek. The Upper Clark Fork River flows through a variety of geographic settings ranging from the broad Deer Lodge Valley to relatively constricted areas such as around Bearmouth. Tributaries, including the Little Blackfoot River, Gold Creek, Flint Creek, and Rock Creek flow out of the surrounding upland areas and join the Clark Fork River. From its headwaters at Butte to Milltown Reservoir, the combined distance of Silver Bow Creek and the Clark Fork River is approximately 140 miles.

Land uses in the UCFRB are resource based. Agriculture occurs in the valley bottoms and timber production and mining take place in upland areas. Recreation-based activities, particularly in the mountains around the city of Anaconda and on various tributaries of the River, are important to the area. Hunting, hiking, camping and winter sports are popular in the mountains around Anaconda. Fishing, floating, waterfowl hunting and bird-watching are particularly popular in and along the Clark Fork River. Cities in the Basin include Butte, Anaconda, Deer Lodge, and Drummond. Approximately 55,000 people reside in the UCFRB.

The UCFRB was the site of extensive mining and mineral processing conducted by ARCO and its predecessors, most notably the Anaconda Company. In order to develop the significant quantities of minerals, principally copper, located in the Butte ore-body, large-scale industrialization occurred in Butte and Anaconda. Mining and related activities resulted in the release of substantial quantities of hazardous substances into the environment. These releases caused extensive injuries to natural resources in the Basin.

**Figure 1**

THE SUPERFUND LAWS

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); subsequently, the State of Montana enacted the Comprehensive Environmental Cleanup and Responsibility Act (CECRA). These statutes – the federal Superfund law and Montana’s Superfund law – were a response to what had become an acknowledged national problem: improper hazardous waste disposal. Prior to the enactment of CERCLA, industrial waste disposal practices were jeopardizing public health and the environment. Environmental laws in existence at the time were inadequate to address the situation. The Superfund laws were designed to fill this statutory gap and achieve cleanup of contaminated sites.

The Superfund laws use a variety of devices to accomplish environmental cleanups:

- They ensure that money is available to conduct cleanups by using the “polluter pays” principle and establishing fairly broad liability schemes.
- They created funds to pay for the myriad of actions that site cleanup might require, ranging from responding to emergencies to assessing conditions and undertaking cleanup efforts.
- They allow states and the federal government to recover their costs of cleanup actions through lawsuits against private parties.
- They require that contaminated sites be prioritized in terms of the risk they pose to public health and the environment.

Under CERCLA, when there was a release or threatened release of a hazardous substance, the Environmental Protection Agency (EPA) is authorized to pursue “response actions” to prevent further harm. Response actions are of two types: “removal actions” which are short-term fixes, and “remedial actions” which are designed to achieve a permanent solution. The Montana Department of Environmental Quality (DEQ) has similar authority under state law.

When undertaking a remedial action, a “Remedial Investigation and Feasibility Study” (RI/FS) must be performed. The RI/FS is really two studies: the RI assesses site conditions and the FS examines various approaches to remedy. In addition, federal and State regulations contain procedural and substantive standards for undertaking remedial actions. A remedy decision is finalized with the issuance of a Record of Decision (ROD).

While the remedy provisions of the Superfund laws seek to prevent further contamination and protect public health and the environment, the natural resource damage provisions of the laws seek to ensure that natural resources will be available for the public to use in the future and to compensate the public for losses arising from the impairment of the public's natural resources.

The law allows the federal and state governments and Indian tribes, acting as "trustees" on behalf of the public they represent, to bring natural resource damage lawsuits if the release of hazardous substances injures natural resources. CERCLA specifically provides that any damages that are recovered by a trustee can only be used to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources. (For the sake of convenience, the words "restore" and "restoration" as used in this document, generally refer to all four types of actions a trustee is authorized to take under CERCLA to address injuries to natural resources, i.e., restoration, rehabilitation, replacement, and acquisition of equivalent resources.)

The Superfund laws establish two basic types of natural resource damages:

- "Restoration Cost Damages" are the costs necessary to restore the injured resource and/or the services it provides to its "baseline condition," meaning the condition the resource would have been in had the hazardous substance not been released. "Services" means those functions performed by a resource for the public or another resource.
- "Compensable Value Damages" represent the economic harm suffered by the public as a result of the injury. These are measured by valuing the benefits the resources supplied.

Both measures of damages, taken together, are designed to put the public back in the position it would have been in had the injury not occurred.

Restoration cost damages may be recovered for those injuries to natural resources that remain (or are anticipated to remain) after any response action. Response actions can, and often do, improve the condition of natural resources. Thus, it would be unfair, and constitute a form of double recovery, to allow trustees to recover restoration cost damages for natural resource injury without taking into consideration the condition of the resource after the response action.

Similarly, trustees may only recover compensable value damages for that degree of economic harm actually incurred by the public. Thus, if a response action mitigates a natural resource injury and lessens the amount of economic harm incurred by the public in the

future, a trustee could not recover damages for a non-existent injury and for a degree of economic harm that was never incurred.

In summary, the effects or anticipated effects of response actions must be taken into account by a trustee when determining the appropriate level of damages owing to the public.

The U.S. Department of Interior (DOI) regulations impose numerous requirements on trustees. A “natural resource damage assessment” is prepared by the trustee to support a claim for damages. The assessment must document, using specified standards and methodologies, that an injury to a natural resource has occurred and is attributable to the release of a hazardous substance. The DOI regulations also contain rules for quantifying damages, including criteria that a trustee must use when making decisions on appropriate restoration, rehabilitation, replacement, and/or acquisition actions for the purpose of determining restoration cost damages.

Both CERCLA and the DOI regulations mandate that after natural resource damages are recovered, the trustee must prepare a restoration plan describing how the damages are to be used. In making decisions about the use of recovered natural resource damages, trustees must consider the criteria alluded to in the immediately preceding paragraph to establish restoration cost damages. These criteria are discussed in Chapter 4. The trustee also must seek and consider public comment on the restoration plan.

RESPONSE ACTIONS IN THE UPPER CLARK FORK RIVER BASIN

In recognition of the public health risks and environmental harm resulting from the widespread contamination of the UCFRB, EPA has listed the entire Silver Bow Creek/Clark Fork River corridor from Butte to Milltown and certain adjacent areas on the National Priorities List (NPL). Four sites have been listed: the Silver Bow Creek/Butte Addition site, the Montana Pole and Treating Plant site, the Anaconda Smelter site, and the Milltown Reservoir/Clark Fork River site. Together these four sites comprise the largest contiguous set of Superfund sites in the country. The sites are further divided into “operable units” (OU) for management and administrative purposes.

The EPA, often in conjunction with the State of Montana, has required ARCO to perform, or has itself performed, a variety of response actions at the UCFRB sites over the past 20 years or so. RODs establishing remedies have been issued for the Butte Mine Flooding OU (Berkeley Pit), the Rocker Timber Framing Plant OU, the Montana Pole and Treating Plant NPL site, the Streamside Tailings OU (Silver Bow Creek), the Old Works OU, the Warm Springs Ponds OUs, the Anaconda Regional Water, Waste and Soils OU (the area around the Anaconda smelter and Opportunity and Anaconda tailings ponds), the Clark

Fork River OU, and the Milltown Reservoir OU. Remaining to be resolved is the remedy for the Butte Priority Soils OU.

MONTANA v. ARCO

In 1983, the State of Montana filed a lawsuit in U.S. District Court against ARCO seeking damages for injuries to natural resources in the UCFRB. In 1991, the State began the preparation of a natural resource damage assessment. The assessment took several years to complete because of the nature of the injuries being investigated, the geographic expanse over which they occurred, and the complexity of both the natural resource damage assessment regulations and the scientific inquiry required by the regulations. This assessment became the basis for the State's claim against ARCO.

The assessment found severe and widespread injury to natural resources in the UCFRB and linked the injuries to the release of hazardous substances for which the State claimed ARCO was legally responsible. Specifically, more than 600,000 acre-feet of groundwater in the Basin have been injured, with most of the injured groundwater occurring in Butte and the Upper Deer Lodge Valley. The assessment also found that trout populations in Silver Bow Creek and the Clark Fork River have been severely injured. Trout are not present in Silver Bow Creek and are present in substantially reduced numbers in the Upper Clark Fork River. In addition, the assessment found injury to wildlife and wildlife habitat along Silver Bow Creek and the Upper Clark Fork River, at Opportunity Ponds, and in an 18 square-mile upland area in the mountains near Anaconda. These injuries are discussed in detail in Chapter 2.

In determining damages, the State identified a number of services that the injured resources formerly provided. The services identified included hunting, the use of surface water for fishing and river-oriented recreation, the use of groundwater for drinking and agricultural purposes, and more esoteric forms of services such as the function that unimpaired resources provide to the public simply by virtue of their existence. To determine compensable value damages, the State put a dollar value on the economic harm suffered by the affected public as a result of these service losses.

To determine restoration cost damages the State undertook the restoration planning analysis required by the DOI regulations. The State prepared a *Restoration Determination Plan* (October 1995) that broke the UCFRB into nine geographic areas: Butte Hill, Area One in Butte, Silver Bow Creek, Montana Pole and Treating Plant, Rocker, Smelter Hill Area Uplands, Anaconda Area, Clark Fork River, and Milltown Reservoir (see Figure 2). For each of these areas, the *Restoration Determination Plan* considered an array of alternatives for restoration and, using the prescribed criteria, selected one of the alternatives.

The costs to implement the selected alternatives constituted the State's claim for restoration cost damages.

Based upon the State's natural resource damage assessment, the State's total claim in Montana v. ARCO was \$764 million, \$342 million of which was restoration cost damages, \$410 million of which was compensable value damages, and \$12 million of which was assessment and legal costs and interest thereon.

SETTLEMENT OF MONTANA v. ARCO

Trial in Montana v. ARCO began in March 1997. While the trial was ongoing, the Court appointed a Special Settlement Master to mediate negotiations between the State and ARCO. These negotiations culminated on June 19, 1998 with the parties agreeing to settle a portion of the case. Subsequently, a second consent decree (referred to as the "Streamside Tailings CD") between the United States, the Confederated Salish and Kootenai Tribes, the State of Montana, and ARCO was reached. This second agreement, among other things, settles response cost claims of the United States for the Streamside Tailings OU and certain natural resource damage claims of the United States and the Tribes. The Court approved the two settlements on April 19, 1999.

The State/ARCO settlement required ARCO to pay to the State \$213 million, plus interest, and to transfer land valued at \$2 million as follows:

- \$118 million, plus the interest accruing thereon from April 6, 1998, to be used for natural resource damage restoration.
- The transfer of real property along Silver Bow Creek valued at \$2 million.
- \$80 million, plus interest, to undertake response actions along Silver Bow Creek.
- \$15 million, plus interest, to reimburse the State for assessment and litigation costs incurred through December 31, 1997, in connection with the natural resource damage lawsuit.

In return, ARCO received a release of natural resource damage liability for: the State's compensable value claims; the State's restoration cost damage claims at Butte Hill, Montana Pole and Treating Plant, Silver Bow Creek, Rocker, Anaconda/Opportunity area, and Milltown Reservoir; and the State's assessment and litigation cost claims through December 31, 1997.

Claims not released by the State, and thus still pending before the Court, are restoration cost damages for Butte Area One, Smelter Hill Area Uplands, and the Clark Fork River, totaling approximately \$180 million. ARCO and the State have agreed to try to settle these claims as RODs are issued for these sites. If no settlement is reached for a particular claim, the parties will return to Court and litigate the matter.

The \$15 million payment by ARCO was made on June 27, 1998. On July 19, 1999, after the Court's approval of the settlement, ARCO made the \$118 million payment to the State. With interest, the payment totaled about \$130 million. The money was deposited with the Montana Board of Investments in a State special revenue fund known as the "UCFRB Restoration Fund."

RESTORATION FUNDING COMMITMENTS SPECIFIED IN SETTLEMENTS

The settlements approved in *Montana v. ARCO* or *United States v. ARCO* impose some requirements for and constraints on the use of a limited amount of the UCFRB Restoration Fund:

- Under the Streamside Tailings Consent Decree and the related State/ARCO Consent Decree, the Department of Fish, Wildlife and Parks (FWP) must spend up to \$3.2 million to restore, replace or enhance wetlands or riparian areas in the Basin. As part of this obligation, the State must, in consultation with the U.S. Fish and Wildlife Service, prepare a wetlands/riparian area restoration plan.
- Under the Milltown Consent Decree, the State is obligated to spend an estimated \$7.6 million from the Restoration Fund, in addition to \$3.9 million to be received from the NorthWestern Corporation, for implementation of the *Draft Conceptual Restoration Plan for the Clerk Fork and Blackfoot Rivers near Milltown Dam* (as amended June 2004).
- Under the Streamside Tailings Consent Decree, the State must spend at least \$500,000 on bull trout restoration. This obligation will be fulfilled by the State's implementation of restoration at Milltown as provided in the Milltown Consent Decree.

This *UCFRB Restoration Plan Procedures and Criteria (RPPC)* will not govern projects and expenditures designed to meet the specific restoration requirements set forth in the above Consent Decrees. In funding these obligations out of the UCFRB Restoration Fund, the State intends to separately account for each of these expenditures.

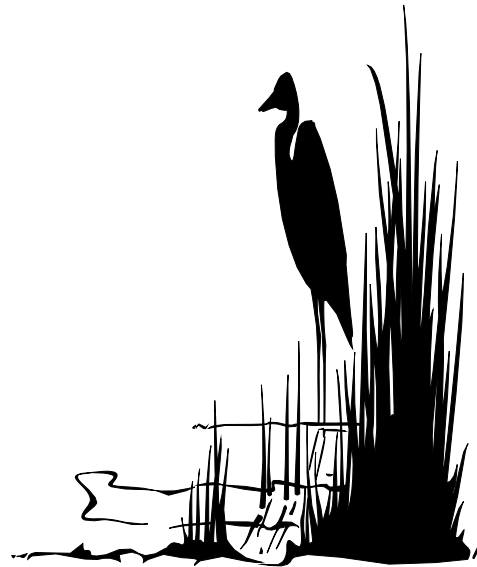
The State also may be responsible for additional response action costs at the Streamside Tailings OU. Remedy implementation along Silver Bow Creek is expected to

cost approximately \$80 million, plus the interest accruing thereon. This \$80 million, plus interest, will be held in a separate special revenue account, referred to as the “Streamside Tailings Operable Unit Fund.” Expenditures from this fund are governed by the ROD and the Explanation of Significant Differences for the Streamside Tailings OU, and are to be jointly authorized by the State and EPA. If a cost overrun occurs during the Silver Bow Creek cleanup, the State is responsible for the first \$10 million of additional costs, and ARCO is responsible for the next \$20 million. If the cost overrun is between \$30 and \$60 million, the State, the United States, and ARCO would each be responsible for \$10 million for the cost overruns in that order.

This is relevant for restoration planning because the consent decrees also require the State to reserve \$10 million, plus interest, in the UCFRB Restoration Fund to cover the State’s share, if any, of such cost overruns. Should the costs of the response action along Silver Bow Creek be less than \$80 million plus interest, any excess money will be transferred from the Streamside Tailings Operable Unit Fund to the UCFRB Restoration Fund and will be available for natural resource restoration.

CHAPTER 2

INJURY TO NATURAL RESOURCES



Chapter 2

INJURY TO NATURAL RESOURCES

This chapter describes the injuries to natural resources in the Upper Clark Fork River Basin caused by the release of hazardous substances as a result of the mining and mineral processing operations of ARCO and its predecessors. These descriptions are based upon the findings of the State's natural resource damage assessment, which is discussed in Chapter 1.

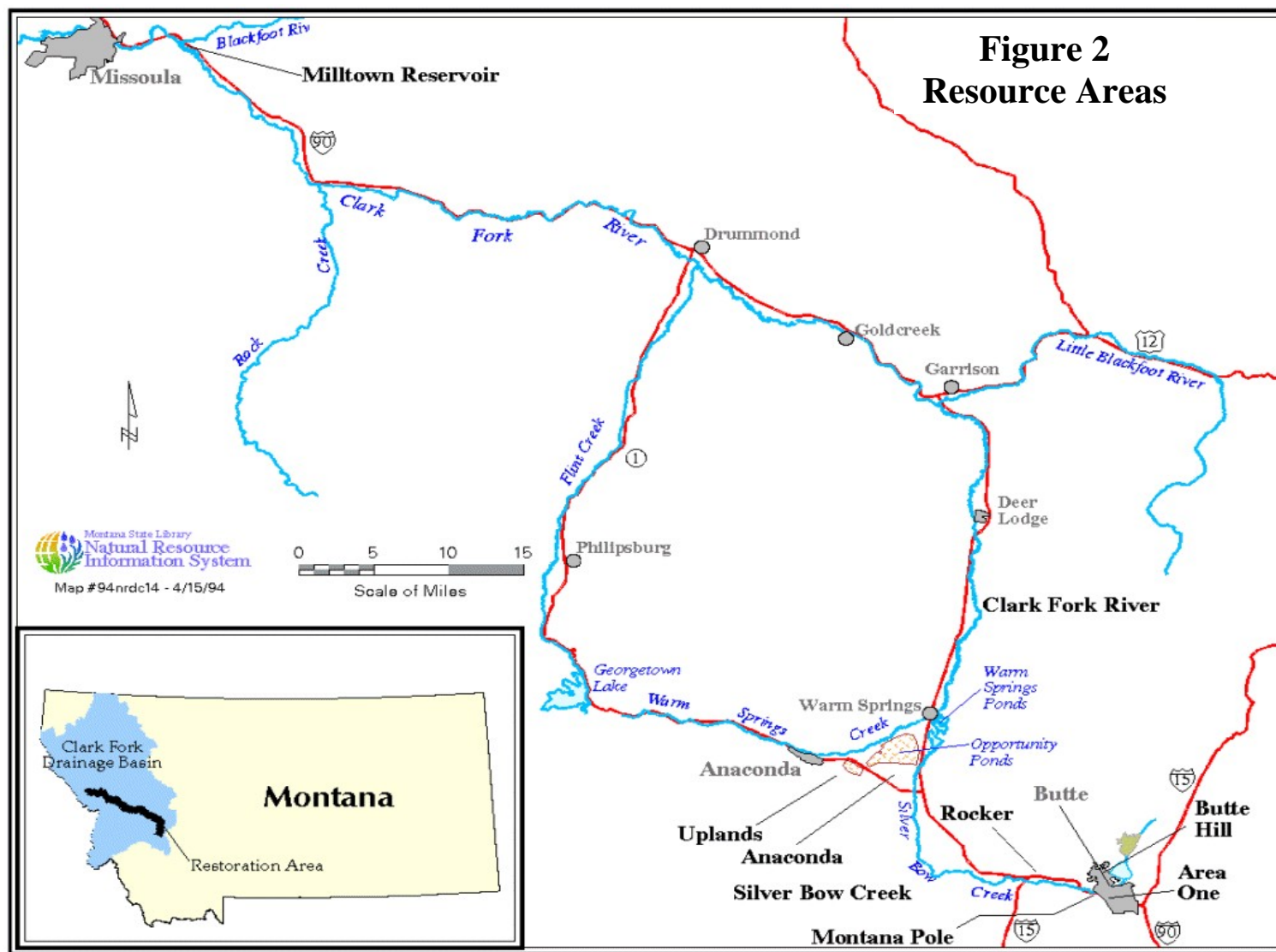
The purpose of this chapter is to help potential project applicants understand the underlying basis of the State's claim for natural resource damages. It should be understood that proposed restoration projects must be directed at the natural resources claimed to have been injured or at the services that these resources once provided. Proposed projects must be designed with an awareness of the current conditions of the resources and services, and the factors causing their impaired conditions, and with an intent to improve upon those conditions.

The nine geographic areas that the State used in its *Restoration Determination Plan* (October 1995) and are described in this chapter are shown on Figure 2.

BUTTE HILL GROUNDWATER RESOURCES

Injury: The Berkeley Pit, the adjoining underground mine workings, and the bedrock and alluvial aquifers on Butte Hill constitute one of the most contaminated bodies of water in the world, currently containing over 60 billion gallons of contaminated water. Mining in Butte began before the turn of the century and ultimately resulted in an extensive network of interconnected subsurface workings that included up to 10,000 miles of tunnels, shafts, stopes and drifts. Because the workings were below the level of the water table, groundwater accumulated in them. In order to mine, it was necessary to pump this water from the mine workings.

Open pit mining began at the Berkeley Pit in 1955. When mining ceased in 1982, the bottom of the Pit was 4,265 feet above mean sea level. The total depth of Berkeley Pit, from the bottom to the highest point on the rim, is 1,780 feet. The areal extent of the Pit is approximately 700 acres. Dewatering the mine workings also kept the Berkeley Pit dewatered. Dewatering, however, ended with the cessation of mining. Consequently, since 1982, as the groundwater has risen toward its pre-mining levels, the Pit and mine workings have been filling with contaminated groundwater. The water level in the Pit in October 2005 was 5,255 feet above mean sea level, which is about 990 feet above the bottom of the pit.



While water level in the Pit and associated bedrock aquifer remains at or below an elevation of 5,410 feet, referred to as the “critical water level” (CWL), the Pit and the connected underground workings will serve as a hydraulic depression into which Butte Hill’s contaminated groundwater will continue to flow. If the water exceeds the CWL, studies indicate that contaminated groundwater will flow away from the Pit, causing further injury to the Butte ground and surface water systems.

Injury at this site is manifested by concentrations of metals and other chemicals grossly in excess of drinking water standards. Mining-related processes have resulted in the release of hazardous substances, such as arsenic, beryllium, cadmium, copper, lead, mercury, zinc, sulfuric acid, and sulfides of copper, arsenic, zinc and lead to the groundwater. The total volume of injured groundwater in the bedrock aquifer (including the underground workings) is estimated at 119,000 acre-feet. In addition, the Berkeley Pit contains some 74,000 acre-feet of contaminated water. Presently, the total volume of injured groundwater in the Butte Hill alluvial aquifer is estimated to be 4,860 acre-feet. The areal extent of the injured groundwater in the bedrock aquifer is about 4,133 acres (6.5 square miles) and in the alluvial aquifer, about 505 acres. When the CWL is reached, the volume of contaminated water in the Pit is expected to increase to 196,000 acre-feet; at that time, the volume of contaminated groundwater in the bedrock aquifer will have increased to about 131,000 acre-feet.

Groundwater contamination in the bedrock aquifer occurs primarily through the leaching of mineralized material, including sulfide minerals and efflorescent salts remaining in underground workings, and generating acid mine drainage. When circulated in the underground workings and bedrock aquifer, acid mine drainage dissolves metal sulfides and releases sulfates and metals to the groundwater.

Other sources of contamination for both the bedrock and alluvial aquifers are waste rock, mill tailings, leach pads, leaching solution (with added sulfuric acid), and mill process solutions. The leaching of exposed ore and mine waste (both by circulating groundwater and added sulfuric acid) also causes injury to groundwater.

Response Action: The Butte Hill Mine Flooding OU seeks primarily to maintain the groundwater in the bedrock system at a certain level, or below that level, to preclude the further release of contaminants into the alluvial aquifer and Silver Bow Creek. The major components of the 1994 Record of Decision (ROD) are:

- Permanently controlling and treating 2.4 million gallons of surface water flowing each day from the Horseshoe Bend area towards the Pit.
- Treating Berkeley Pit water once it approaches the CWL of 5,410 feet.

- Establishing a bedrock groundwater control area to restrict installation of bedrock wells and a comprehensive ground and surface water monitoring program; and
- Continuing the treatment of water from the Travona shaft, located less than a mile northeast of Butte's waste water treatment plant, to maintain groundwater levels in that area.

Keeping the water level below the 5,410 foot level will prevent water from entering and contaminating the area's alluvial aquifer. EPA estimates that this level may be reached by the year 2018. Pumping and treating water will not address the continued infiltration of contamination from the existing mine tunnels and other surface and subsurface sources. Consequently, groundwater in both the alluvial and bedrock aquifers in the Butte Hill area and in the Pit itself may continue to be contaminated above drinking water standards for thousands to tens of thousands of years.

BUTTE AREA ONE GROUND AND SURFACE WATER RESOURCES

Injury: The deposit of wastes in the city of Butte from mining and mineral-processing operations has resulted in injury to surface and groundwater resources at Area One, which extends from the upper end of the Metro Storm Drain in Butte to the west or downstream end of the former location of the Colorado Tailings along Silver Bow Creek. The portion of Area One that contained the Colorado Tailings, the Butte Reduction Works, and the adjacent reach of Silver Bow Creek is known as Lower Area One (LAO). Injured groundwater in Area One is present in the alluvial aquifer under and adjacent to the Metro Storm Drain and Silver Bow Creek. The watercourse known as the "Metro Storm Drain" generally follows the historic channel of Silver Bow Creek. The NRD Butte Area One groundwater and surface water injury area is a part of the Butte Priority Soils OU.

Since the late 1800s, disposal practices from mining and milling operations in Butte have resulted in the presence of tailings and other mining-related wastes along the Metro Storm Drain, Silver Bow Creek, and throughout the city of Butte. Much of the waste is associated with three former facilities: the Parrot Smelter, the Butte Reduction Works, and the Colorado Smelter. The Parrot Tailings, which lie along and generally northeast of the Metro Storm Drain above Harrison Avenue, are the major source of groundwater contamination to the Metro Storm Drain. Tailings probably associated with the Parrot Smelter also lie along the Metro Storm Drain between Harrison Avenue and Silver Bow Creek. The Butte Reduction Works Tailings and the Colorado Tailings were deposited adjacent to Silver Bow Creek in LAO. The majority of the Colorado Tailings were removed in the 1990's. In addition to these waste sources, dispersed surface and buried tailings, mine and mill sites, dumps, and contaminated fill areas are located throughout Butte. These

sources within the Butte Priority Soils OU also contribute to the surface and groundwater contamination.

Injury to groundwater has been demonstrated by the occurrence of concentrations of cadmium, zinc, iron, lead, copper, arsenic and sulfate that exceed drinking water standards. The areal extent of groundwater contamination is estimated to be approximately 560 acres. The total volume of injured groundwater is estimated to be 11,590 acre-feet, and the annual flux of groundwater to surface water in the area (i.e., discharge to Metro Storm Drain and/or Silver Bow Creek) is estimated to be 2,353 acre-feet per year.

Groundwater contamination at Area One occurs in three ways:

- By the leaching of hazardous substances in the unsaturated zone to downgradient groundwater via infiltration of precipitation or rising capillary groundwater.
- By the leaching of hazardous substances in the saturated zone via groundwater contact with sources.
- By the transport of water containing hazardous substances through the unsaturated or saturated zone to downgradient groundwater.

Silver Bow Creek in this area is contaminated by both the discharge of contaminated groundwater and by surface-contaminated runoff. The Metro Storm Drain receives surface runoff during snowmelt and storms and intercepts contaminated groundwater, which then discharges to the upper Silver Bow Creek. Contaminated surface water in Silver Bow Creek flows downstream from Area One and is therefore a source of hazardous substances to injured resources downstream.

Response Action: Numerous interim response actions have been completed at the BPSOU in the past 20 years, including:

- Removal of 1.2 million cubic yards of tailings and impacted soil from LAO during the 1990's. Silver Bow Creek was elevated with 560,000 cubic yards of backfill and relocated to facilitate control of groundwater and surface water within the area.
- Construction of engineered caps over contaminated mine waste at numerous locations on Butte Hill covering some 420 acres.
- Residential yard replacement at numerous locations on the Butte Hill.

- Construction of storm water controls at numerous locations on the Butte Hill.
- Excavation along the Metro Storm Drain channel to install a pipeline to convey effluent from the Horseshoe Bend/Berkeley Pit Treatment Plant and a groundwater collection system.

Based on EPA's December 2004 Proposed Plan, the following response actions are likely to be implemented at BPSOU:

- Collection of contaminated groundwater at the east end of Lower Area One.
- Treatment of 750 gallons per minute of contaminated groundwater at a lime treatment facility at Lower Area One.
- Development of a Best Management Program to address contaminated storm water runoff. This Program could include source controls on mine wastes areas, sediment controls, routing of storm flows, lime treatment of contaminated storm water or placement into the Berkeley Pit.
- Continuation of the on-going Lead Abatement Program that involves sampling and clean up of residential yards.
- Reclamation and enhancement of the Granite Mountain Memorial Area and monitoring of previously reclaimed areas on Butte Hill.
- Monitoring of surface water and site-wide vegetation.

The ROD for the Butte Priority Soils Operable Unit is expected in 2006.

SILVER BOW CREEK AQUATIC AND RIPARIAN RESOURCES

Injury: Aquatic and riparian resources of Silver Bow Creek have been injured by hazardous substances including arsenic, cadmium, copper, lead, and zinc released from mining and mineral processing operations in the Butte area. Silver Bow Creek extends from the lower end of the Colorado Tailings to Warm Springs Ponds, a distance of approximately 23 miles. The creek has been divided into four reaches reflecting its geomorphology:

- A 5.2 mile reach originating at the Colorado Tailings and continuing downstream from Butte to the town of Nissler (Subarea 1).

- A 5.6 mile reach from Nissler to the upper end of Durant Canyon (Subarea 2).
- A 5.0 mile reach within Durant Canyon (Subarea 3).
- A 6.8 mile reach from the lower end of Durant Canyon and continuing to the Warm Springs Ponds (Subarea 4).

From the late 1800s until the 1980's, tailings and other mining wastes containing hazardous substances were discharged to Silver Bow Creek. As a result, hazardous substances are pervasive throughout the Silver Bow Creek ecosystem, including its waters, the floodplain and streambed. The resulting injuries to the Silver Bow Creek ecosystem included:

- Surface water contains concentrations of hazardous substances that exceed water quality standards established for the protection of aquatic life and thresholds that have been demonstrated to cause injury to fish.
- Streambed sediments contain significantly higher concentrations of hazardous substances than would exist under baseline conditions.
- The number of benthic macroinvertebrates (i.e., insects) is significantly reduced relative to baseline conditions.
- Trout have been eliminated from Silver Bow Creek.
- 748 acres of Silver Bow Creek's floodplain contain phytotoxic concentrations of hazardous substances resulting in virtually no vegetation in this area.
- 1,266 acres of Silver Bow Creek's floodplain contain tailings and contaminated soils that are a source of hazardous substances to Silver Bow Creek aquatic resources.
- Populations of otter, mink and raccoons that rely on fish or benthic macroinvertebrates in their diets have been virtually eliminated from the Silver Bow Creek ecosystem.
- Populations of birds, mammals and other wildlife, which would otherwise be abundant in the Silver Bow Creek riparian zone, have been substantially reduced due to habitat elimination.

Prior to the start of remediation activities in 1999, an estimated 4.5 million cubic yards of tailings and contaminated soils ranging in thickness from a few inches to as much as

6 feet covered approximately 1,300 acres of the original floodplain surface. Upstream and downstream of Durant Canyon, where the floodplain is relatively broad, the contamination extends across 500 acres and 700 acres, respectively. In the canyon, where the floodplain is confined, contamination extends across 92 acres. Infiltration of precipitation through these materials has leached hazardous substances to underlying floodplain soils and groundwater.

The bed of Silver Bow Creek is comprised of contaminated sediment and underlying contaminated alluvial material. Streambed contamination varies, depending on channel form (i.e., riffle, pool or run) and stream reach location. The estimated thickness of contaminated material ranges from several inches to 2.5 feet. The volume of contaminated material within the Silver Bow Creek streambed prior to the start of remediation was estimated to be 236,000 cubic yards.

Various waste sources contribute to injuries in the Silver Bow Creek ecosystem. In addition to Butte area sources, the creek is contaminated by floodplain tailings and contaminated soils, including railbeds constructed with mine and mill wastes, and streambed and streambank sediments.

Release mechanisms differ for aquatic resources and riparian resources. Mass wasting, bank erosion and slumping, and surface runoff over tailings and rail-bed materials release hazardous substances to surface water and bed sediments. In addition, at high water stage, Silver Bow Creek carries increased quantities of contaminated suspended sediments from reaches upstream to those downstream. As high waters recede, contaminated material is re-deposited in bed, bank, and floodplain areas. For riparian resources, release mechanisms include chemical and biological oxidation/reduction and desorption processes in contaminated floodplain tailings and soils. These processes increase the bio-availability and toxicity of hazardous substances to riparian vegetation.

Response Action: The EPA and DEQ jointly issued a ROD for Silver Bow Creek in November 1995 and supplemented it with an Explanation of Significant Differences in August 1998. The major components of the remediation are:

- Removal of some 4.5 million cubic yards of tailings from the floodplain to repositories outside of the floodplain or to Opportunity Ponds.
- Backfilling of excavated areas.
- Reconstruction of the stream banks and stream bed, and revegetation with native species.

- Remediation (e.g., excavation or capping) of contaminated rail-bed materials that impact the stream or floodplain and present threats to human health.

The DEQ, in consultation with EPA, began clean up of Silver Bow Creek in late 1999, with completion expected by 2012. The major remedial accomplishments to date are:

- Reconstruction of the first seven miles of Silver Bow Creek and remediation design for the next two miles.
- Removal of tailings in approximately 400 acres of tailings impacted area.
- Removal of about 2 million cubic yards of tailings from the floodplain, which amounts to almost one-half of the tailings volume present in the entire site. This includes removals in the first seven miles of the Creek and selected removals along miles 17 and 18.
- Revegetation of stream banks and floodplain in the first six miles of Silver Bow Creek.

Although the Silver Bow Creek remedy is extensive and will significantly mitigate natural resource injury, the remedy will not bring the Creek to baseline conditions. Restoration actions to improve aquatic and wildlife habitat are needed along the entire stream system. It may take many years thereafter for the resources, including the vegetation and fishery, to return to baseline.

Restoration Activities: The State has funded five restoration grant projects totaling \$10.5 million that coordinate with DEQ's remediation work along the first 10 stream miles of Silver Bow Creek to Durant Canyon and along stream miles 16 – 18 near Opportunity. Restoration actions conducted have mainly involved floodplain revegetation enhancements, tailings removal, aquatic habitat enhancements, land acquisitions and easements, and trail construction.

MONTANA POLE GROUNDWATER AND SOIL RESOURCES

Injury: The former site of the Montana Pole and Treating Plant is located in the southwest portion of Butte and is bounded on the north by Silver Bow Creek, on the east by a railroad right-of-way, on the south by Greenwood Avenue, and on the west by the former location of the Colorado Smelter. An elevated portion of Interstate 15/90 cuts across the site in an east-west direction.

During the lifetime of the facility, hazardous substances primarily in the form of pentachlorophenol (PCP) were released directly to the ground surface and infiltrated to the

underlying groundwater. An estimated 1.1 million pounds of PCP contaminated the site. Other contaminants released from the plant and detected on site include: polynuclear aromatic hydrocarbons (PAH); benzene, toluene, ethyl benzene and total xylenes (BTEX); and dioxins and furans.

Defined by exceedances of the drinking water standards for PCP, the areal extent of groundwater injury at the Montana Pole site was 44 acres, with a total volume of about 350 acre-feet. This groundwater also was contaminating Silver Bow Creek. In addition, approximately 239,000 cubic yards of soil were also contaminated by PCP.

At Montana Pole, soils and groundwater contaminated each other. Specifically, the hazardous substances in the contaminated groundwater plume are in a non-aqueous phase (oil product) and a dissolved phase. The non-aqueous phase, which was up to three feet thick, floated on top of the groundwater. When the groundwater level fluctuated, some portion of the floating product adhered to any contacted soils, thus re-contaminating them. Upon contact with groundwater, either through water table fluctuations or capillary action, the PCP in the soils was transported to and dissolved in the groundwater. Unlike the non-aqueous phase, the dissolved phase was not confined to the groundwater surface but extended throughout the aquifer. The dissolved phase moved with the groundwater through the aquifer to Silver Bow Creek. Contaminated soils also served as a source for groundwater contamination due to infiltration of precipitation.

Response Action: The EPA and DEQ jointly issued a ROD for the Montana Pole Site in 1993. The DEQ, in consultation with EPA, is conducting the remediation with monies from a 1996 settlement with the PRP group for \$35 million. The major remedy components are:

- Excavation of 200,000 cubic yards of contaminated soils.
- Treatment of excavated soils to cleanup levels of 34 ppm for PCP by above-ground biological treatment.
- Backfilling the treated soils to the excavated areas.
- Soil flushing the contaminated soils underlying the berm supporting the Interstate highway.
- Treatment of extracted groundwater to cleanup levels and discharge to Silver Bow Creek.

After the remedial action is completed, groundwater may remain contaminated, but contaminant concentrations will be significantly reduced from pre-remedy conditions.

ROCKER GROUNDWATER AND SOIL RESOURCES

Injury: The site of the former Rocker Timber Framing and Treating Plant is adjacent to Silver Bow Creek approximately 7 miles west of Butte. The plant milled and treated timbers for the mining industry using a process that required the application of dissolved arsenic and creosote. Organic compounds, metals, and metalloids released from wood treatment processes have been transported through soils to the water table and have contaminated the groundwater system beneath and next to the site. While arsenic is the contaminant of most concern, contaminants in the groundwater also include cadmium, copper, lead, zinc, iron, manganese, sulfate and polynuclear aromatic hydrocarbons. Prior to remediation, as delineated by exceedances of drinking water standards for various contaminants, there were approximately 191 acre-feet of contaminated groundwater. The areal extent of contamination was about 26 acres.

At Rocker, soils and groundwater contaminated each other. Contaminants in groundwater adhered to aquifer materials. In turn, contaminated soils were a source of contamination to groundwater. Infiltrating precipitation leached contaminants from soils in the unsaturated zone to groundwater. In addition, upgradient groundwater that moved through contaminated site soils was exposed to hazardous substances. Accordingly, soil contamination perpetuated the contamination of groundwater and the migration of hazardous substances at the site.

Response Action: The EPA and DEQ jointly issued a ROD in 1995 and ARCO began remediation in 1996. The remedy used an innovative technique that entailed the excavation of some of the source material and the injection of an iron compound into the soil to fix the arsenic in-place. Groundwater exposed during excavation of source materials was also treated to remove arsenic and ARCO developed an alternative water supply for Rocker residents. While groundwater concentrations of arsenic and other contaminants have decreased since the remedy was implemented, the newness of the remediation technology prevents a fully informed assessment of residual injury. ARCO remains liable for additional remedial work, if necessary, to prevent plume migration in the adjoining groundwater.

SMELTER HILL AREA UPLAND RESOURCES

Injury: A total of about 17.8 square miles (11,366 acres) of land was injured in the “Smelter Hill Area Uplands,” which is comprised of portions of Smelter Hill (4,653 acres), Stucky Ridge (2,409 acres), and the Mount Haggin Game Management Area (4,304 acres). The injury is due to releases of hazardous substances from the Anaconda Smelter. Enormous

volumes of hazardous substances were continually released into the air by smelter operations and subsequently deposited onto the land, which as a result, was denuded of vegetation. The lack of vegetation, in turn, resulted in significant erosion and topsoil loss.

Soils in this area have elevated concentrations of hazardous substances including arsenic, cadmium, copper, lead and zinc. Consistent with visual observation, laboratory tests have confirmed that these soils are toxic to plants. Metal concentrations are highest in the upper two inches of soil. Elevated metal concentrations on the soil surface prevent seed germination and, thus, natural recovery. There has been a shift in plant community types from predominantly forest with open grassland to predominantly sparse grassland or bare ground. The elimination of vegetation communities in the injured area has resulted in a severe reduction in the quantity of wildlife habitat. Birds of prey, woodpeckers, songbirds, squirrels, porcupine and marten have suffered local extinction in the impacted areas. Many other species, including black bear and elk, have suffered population reductions.

Response Action: A 1998 ROD established criteria and a process for determining what reclamation will take place across the Smelter Hill Upland Area. The ROD provides for reclamation efforts involving the planting of trees, shrubs, and grasses across parts of the Stucky Ridge, Smelter Hill, and Mount Haggin injured areas.

On those areas of Stucky Ridge and Smelter Hill where remediation is to occur, natural resource injuries may be reduced. In those areas of Smelter Hill, Stucky Ridge and Mount Haggin that will not be subject to remediation, significant residual injury will remain for centuries.

ANACONDA AND OPPORTUNITY PONDS AND OTHER ANACONDA AREA RESOURCES

Injury: Disposal, releases, and spills of solid mining wastes, milling debris, smelting by-products, and process fluids occurred over the last 110 years in the Anaconda area. Mining and processing wastes containing hazardous substances have caused injury to the area's groundwater, riparian vegetation, and wildlife resources. There are five areas of injury as described below:

- **Old Works:** Copper ore mined in Butte was processed at the Old Works facility along Warm Springs Creek from 1883 to shortly after the turn of the century. Approximately one million cubic yards of wastes – containing high concentrations of arsenic, cadmium, copper, lead and zinc – were deposited at and around the facility. These wastes have injured the alluvial groundwater system around Old Works and are also a source of surface water contamination in Warm Springs Creek.

- Smelter Hill: In 1902, the Washoe Works (Anaconda Smelter) began operations on Smelter Hill. By the 1930s, thousands of tons of ore were processed on a daily basis. Infrastructure to support the smelting operations included waste piles and lagoons, leach pads and numerous facilities extending across approximately 600 acres of Smelter Hill. In the course of operations, large volumes of hazardous substances were discharged, disposed of, or otherwise released to the environment. Both historical and current releases of hazardous substances have injured groundwater in the bedrock aquifer of Smelter Hill, with arsenic, cadmium, iron, manganese, zinc, fluoride and sulfate at concentrations exceeding drinking water standards. Surface soil contamination is most severe at the location of the former smelter complex. As precipitation infiltrates through contaminated soils and the unsaturated portion of the bedrock aquifer, hazardous substances are dissolved and transported to groundwater. Similarly, groundwater flowing through the contaminated fractured bedrock aquifer dissolves hazardous substances adhering to aquifer materials. Groundwater contamination in the bedrock aquifer extends to a depth of at least 200 feet below the land surface.
- Anaconda and Opportunity Ponds: Tailings from the Washoe operation were deposited in the 700-acre Anaconda Ponds and the 3,400-acre Opportunity Ponds, resulting in significant groundwater contamination. Groundwater at some locations under Opportunity Ponds has elevated concentrations of contaminants to depths of 70 feet below the ground surface. Contaminant plumes of arsenic, cadmium, and zinc are smaller than plumes of iron, manganese and sulfate. The former set of plumes are found beneath the Ponds only, while the latter set of plumes are found beneath and extend down gradient of the Ponds to the Mill-Willow Bypass and Warm Springs Creek. The volume of waste materials in Anaconda Ponds is about 100 million cubic yards and in Opportunity Ponds is about 130 million cubic yards. Hazardous substances are leached from these materials and transported to groundwater, either when precipitation infiltrates through the tailings or when groundwater moves through tailings and/or the contaminated alluvial aquifer. The large volume of tailings in contact with groundwater facilitates leaching at the Opportunity Ponds. Estimates of the total volume of injured groundwater in the Anaconda area are 440,000 acre-feet extending over 40 square miles.
- Warm Springs Ponds: In 1918, Silver Bow Creek was dammed to create Warm Springs Ponds (WSP) 1 and 2; Pond 3 was built in the 1950s. In total, the Ponds cover an area of approximately four square miles. These settling Ponds contain mining and smelting wastes from upstream sources. Seepage from WSP has injured groundwater below and north of the ponds to at least 40 feet below the ground surface as evidenced by exceedances of drinking water standards for arsenic, cadmium, fluoride, iron, manganese, and sulfate. The WSP contain about 19 million cubic yards of tailings, contaminated

sediments, and sludges. Pond water seeps through contaminated pond berms and bed sediments and carries contaminants to the underlying groundwater. Groundwater generally flows north from the WSP, contaminates coarse-grained alluvial material, and is captured by a trench which returns the water to the WSP.

The total volume of injured groundwater in the Anaconda area is estimated to be 440,000 acre-feet extending over 40 square miles.

In addition to the groundwater injury, the tailings at Opportunity Ponds are phytotoxic and the absence of vegetation has resulted in the elimination of wildlife across the 3,400 acre Opportunity Ponds.

Response Actions: There have been six RODs for this area to date. The Old Works site was remediated through the removal of contaminated material and capping of the area. The tailings and other wastes in WSP still remain. However, the berms of the WSP have been constructed to prevent the release of wastes in the ponds to the Clark Fork River, which could occur as a result of earthquakes or floods. Also, as mentioned above, a groundwater collection system has been installed at the WSP. In addition the Warm Springs Ponds RODs required improvements in the treatment capabilities of the pond system through lime addition and water retention control, and also required the removal of tailings in and along the Mill-Willow Bypass.

Actions pursuant to the September 1998 ROD issued for the Anaconda Regional Wastes, Water and Soils OU will reclaim much of the area over the next decade or so. Remedial actions have revegetated the Anaconda Ponds. The Opportunity Ponds will be revegetated by in-situ reclamation or by soil capping. Other areas planned for remediation are those near Silver Bow Creek but outside the SSTOU boundary and in the old Mill Creek townsite area. Remediation should reduce the amounts of contaminant migration to the groundwater. However, wastes in the areas will remain in place and continue to contaminate the groundwater.

UPPER CLARK FORK RIVER AQUATIC AND RIPARIAN RESOURCES

Injury: Aquatic and riparian resources of the Upper Clark Fork River from the Warm Springs Ponds to the Milltown Reservoir have been injured by a variety of hazardous substances released from mining and mineral-processing operations in the Butte and Anaconda areas. Injuries to the Upper Clark Fork River resources caused by releases of hazardous substances include:

- Surface water contains concentrations of hazardous substances that exceed water quality standards established for the protection of aquatic life and thresholds that have been demonstrated to cause injury to fish.
- Bed sediments contain hazardous substances at concentrations that exceed baseline conditions by, on average, a factor of more than ten, and exceed concentrations that are expected to injure benthic macroinvertebrates.
- Benthic macroinvertebrate tissues contain hazardous substances.
- Trout populations are approximately one-sixth (17 percent) of baseline due to exposure to contaminated surface water and consumption of contaminated benthic macroinvertebrates.
- 215 acres of floodplain contain phytotoxic concentrations of hazardous substances and are therefore largely or entirely devoid of vegetation.
- Thousands of additional floodplain acres contain tailings and contaminated soils and are a continuing source of hazardous substances to aquatic and riparian resources.
- Populations of otter, mink and raccoons that feed on fish and/or benthic macroinvertebrates are significantly reduced relative to baseline conditions.
- Reduced riparian vegetation along the river has reduced the populations of other wildlife.

Numerous waste sources contribute to injuries in the Clark Fork River: Silver Bow Creek, which discharges into Warm Springs Ponds (which, in turn, discharges into the Upper Clark Fork River via the Mill-Willow Bypass); the Ponds themselves; contaminated groundwater beneath the Opportunity Ponds; and wastes along Warm Springs Creek. The principal sources of contamination, however, are tailings and contaminated soils in the Upper Clark Fork River floodplain and in bed and bank sediments of the river. The areal extent of floodplain contamination has been estimated at thousands of acres. The extent of contamination in bed sediment and streambanks has not been quantified.

Tailings and contaminated soils and sediments are cycled between the floodplain and the river. Hazardous substances in the floodplain are released to surface water and bed sediments by surface runoff over exposed surfaces, scouring during bankfull and overbank high flows, and riverbank scouring and erosion due to channel migration. Contaminated bed sediments and floodplain deposits are also re-entrained and re-deposited on the floodplain by overbank high flows. At high water stage, the Clark Fork River also carries increased quantities of contaminated suspended sediments from reaches upstream to those

downstream. As high waters recede, contaminated material is re-deposited in bed, bank, and floodplain areas.

Response Action: The EPA and DEQ jointly issued a ROD for the Upper Clark Fork River Operable Unit in May 2004. Major remedy components include:

- removal of areas of exposed tailings (with a limited exception);
- treatment of other impacted soils and vegetation in place;
- removal of some areas of mine-waste impacted soils and vegetation which cannot or should not be treated in place;
- stabilization and vegetation of stream banks;
- disposal of contaminated materials at the Opportunity Ponds repository;
- use of Best Management Practices (BMPs) to protect the River;
- use of weed control and institutional controls; and
- monitoring and sampling during and after cleanup.

Negotiations began in 2004 between the DEQ, EPA, NRDP and ARCO on a possible joint remediation/restoration consent decree that would involve settlement of the State's NRD claim for this site.

MILLTOWN GROUNDWATER RESOURCES

Injury: Milltown Reservoir, located at the confluence of the Clark Fork and Blackfoot Rivers, is approximately 125 miles downstream from the Clark Fork River's headwaters near Warm Springs Ponds. Approximately 6.6 million cubic yards of sediments have been deposited in the reservoir as a result of the downstream transport of mining and milling wastes from the Butte and Anaconda areas. These reservoir sediments contain hazardous substances at concentrations significantly greater than baseline and have injured the groundwater below. Contaminants are released as water flows through the reservoir sediments, carrying them from the sediments to the underlying alluvial aquifer. The areal extent of the plume of arsenic, which exceeds drinking water standards is approximately 110 acres; the volume of the largest contaminant plume (manganese) is approximately 6,500 acre-feet.

Releases of contaminants from reservoir sediments are believed to result from various geochemical and physical processes:

- The reduction of oxide minerals in the lower 15 to 20 feet of sediments.

- The alternating oxidation and reduction of sulfide minerals in the upper 2 to 10 feet of sediments caused by fluctuating water levels in the reservoir. (NorthWestern Corporation's current operating license now limits the water level fluctuation to a maximum of two feet.)
- The scouring of bed and bank sediments resulting from ice flows and floods.

Response Action: In 1985, ARCO provided an alternative water supply for Milltown residents whose wells were contaminated as a result of the hazardous substances releases from contaminated sediments in the reservoir. The EPA and DEQ jointly issued a ROD for this site in 2004. The major remedy components include:

- removal of the most heavily contaminated sediments, approximately 2.2 million cubic yards;
- disposal of these contaminated sediments at the Opportunity Ponds repository;
- removal of the spillway and radial gate section of the Milltown Dam;
- redesign of the river channel and banks to ensure that contaminated sediments left in place are secured and adequately vegetated;
- continuation of the replacement water supply program and implementation of temporary groundwater institutional controls;
- monitoring and sampling during and after cleanup; and
- integration of restoration activities proposed by the State.

Implementation of this estimated \$106 million remedy will take about six years (2004-2009) to complete.

Proposed Restoration: In April 2003, the State issued a Draft Conceptual Restoration Plan for restoration of the Clark Fork and Blackfoot Rivers near Milltown Dam for public comment. As a result of public comment, revisions to the proposed remediation plan, agreements with Northwestern Corporation and ARCO, and additional information, the State revised this conceptual plan in June 2004. The revised plan involves restoration of three reaches of Clark Fork River and one reach of Blackfoot River that is within or adjacent to the remediation area. After further data collection and review of the plan by a panel of national

experts in April 2005, the State produced a more detailed restoration design plan in October 2005. Major components of this restoration plan, estimated to cost \$11.5 million, include:

- removal of the Dam's divider block, power house, and north(right) abutment;
- channel and floodplain realignment of all four river reaches; and
- implementation of soft stabilization/revegetation techniques to stabilize the floodplain and channel.

In August 2005, federal, state, and tribal governmental entities reached an agreement on a joint remediation/restoration Consent Decree. This joint action, which will occur over about an 8-year period, will allow the Milltown site to be returned to an ecologically healthy area supporting natural stream system processes.

IMPAIRED SERVICES

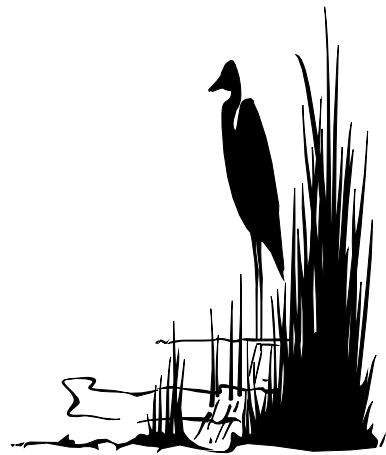
The following services are impaired by injuries to natural resources in the Upper Clark Fork River Basin:

- Services provided to human beings by groundwater, including domestic and industrial consumption and use, irrigation, and waste disposal and assimilation (septic tank effluents).
- Services provided by soils, vegetation, wildlife habitat, and wildlife, including the many activities that revolve around them, such as hunting, birdwatching, wildlife photography, hiking, and general recreation.
- Services provided by surface water and aquatic resources, including such activities as fishing, hunting, floating, and general recreation.

The above list focuses only on those services that natural resources provide to humans. It does not address the services that natural resources provide to other natural resources. For example, vegetation is a source of organic matter to soil, which in turn provides benefits to invertebrates, which in turn benefit birds, and so on. These are all services that a resource provides for other resources. By not listing these services here, the State is not suggesting that they are not important.

CHAPTER 3

RESTORATION PLANNING PROCESS AND IMPLEMENTATION



Chapter 3

RESTORATION PLANNING PROCESS AND IMPLEMENTATION

This chapter describes the procedures that will be followed when making restoration funding decisions. The chapter is divided into four sections. The first section describes the entities that will participate in the decision-making process and identifies the role they will play. The second section outlines the annual restoration work plan cycle, who will be eligible to propose and carry out restoration projects, the application and project evaluation process that will be followed, and how restoration funding decisions will be made. The third section discusses the role of the public. And the final section discusses project implementation, follow-up and monitoring.

PLANNING ENTITIES

Governor

CERCLA provides that the “Governor of each state shall designate state officials who may act on behalf of the public as trustees for natural resources.” In 1990, Governor Stephens designated himself “Trustee.” Since that time the Governor of the State of Montana has been the ultimate decision maker on all aspects of Montana’s lawsuit to recover natural resource damages. In addition the Governor, as Trustee, also has ultimate authority over restoration planning and expenditures. Accordingly, this document is prepared on behalf, and under the authority, of the Governor in his/her role as trustee.

Policy Committee and Trustee Restoration Council

In 1990, Governor Stephens formed a Natural Resource Damage Program Policy Committee (Policy Committee) consisting of State officials to advise him on matters concerning the ARCO lawsuit. The 1991 Legislature ratified this arrangement, directing the Policy Committee to “guide and make natural resource damage litigation program policy recommendations.” The members of the Policy Committee are the Governor’s Chief of Staff and the directors of the Departments of Environmental Quality, Fish, Wildlife and Parks, and Natural Resources and Conservation. The Attorney General serves as an advisor to the Policy Committee.

The Governor has directed the Policy Committee to assume certain restoration planning authority. In doing so, the committee will act as the “Upper Clark Fork River Basin Trustee Restoration Council” and will be responsible for recommending to the Governor annual restoration work plans to be funded with the natural resource damages recovered by the State in Montana v. ARCO. The Chairman of the UCFRB Remediation and Restoration Education Advisory Council shall serve as a voting member of the UCFRB Trustee Restoration Council and shall speak for the Advisory Council at meetings of the Trustee

Restoration Council. Decisions of the Trustee Restoration Council shall be made by majority vote.

UCFRB Remediation and Restoration Education Advisory Council

By executive order, the Governor established the Upper Clark Fork River Basin Remediation and Restoration Education Advisory Council (Advisory Council) in 1998 to “promote public understanding of the State’s efforts to remediate and restore sites in the Upper Clark Fork River Basin that have been injured by hazardous substances for which ARCO is liable.” To effectuate its public outreach mission, the Council may provide “advice...to the Governor with respect to issues involving remediation and restoration efforts in the Upper Clark Fork River Basin.” Any advice, however, must “be consistent with the requirement that such funds [i.e., the recovered damages] be used for restoration or replacement of the injured natural resources in accordance with a restoration plan prepared by the State of Montana as provided by law.” Thus, this *Restoration Plan Procedures and Criteria* should prove useful to the Advisory Council as it performs its responsibilities of advising the Governor and promoting public understanding of the restoration and remediation processes.

Natural Resource Damage Program

The Natural Resource Damage Program (NRDP), operating under the direction of the Policy Committee, conducted the State of Montana’s natural resource damage assessment and prepared the State’s *Restoration Determination Plan* (October 1995). The NRDP has also been responsible for prosecuting the State’s natural resource damage lawsuit against ARCO. While the litigation arm of the NRDP will continue to prosecute the State’s remaining claims against ARCO, the restoration arm of the NRDP, under the guidance of the Trustee Restoration Council, will administer the restoration program established by this *Restoration Plan Procedures and Criteria*. The responsibilities of the NRDP will include screening and reviewing all proposed restoration projects, preparing drafts of the annual restoration work plan, and monitoring and accounting for restoration work that is performed. The NRDP will also make recommendations on project funding to the Trustee Restoration Council.

Tribes, the Department of the Interior and EPA

The State of Montana, Confederated Salish and Kootenai Tribes (Tribes) and the U.S. Department of the Interior (DOI) have entered into a Memorandum of Agreement (MOA) that establishes a framework for coordinating and cooperating in efforts to restore natural resources in the UCFRB. The MOA provides for the parties to consult in restoration

planning, specifies consideration by the parties of certain matters in their restoration planning, and provides for a non-binding dispute resolution procedure. Many of the MOA's provisions are built into this *Restoration Plan Procedures and Criteria* so as to integrate the elements of the State's restoration planning process.

The U.S. Environmental Protection Agency (EPA) is given the responsibility under CERCLA to select appropriate response actions for the four NPL Sites within the UCFRB. EPA has engaged in a series of response action cleanups at these sites from 1983 to the present. EPA's response action authority requires EPA to select removal actions to address immediate threats and remedial actions to address long-term solutions that are protective of human health and the environment. EPA is also required to consult and coordinate with natural resource damage trustees when it conducts investigations or sampling, and trustees are required to consider EPA's response actions when they consider the implementation of restoration actions. The State will consult with EPA during each restoration planning cycle as further discussed herein.

Legislative Oversight Committee

In 1993, the Montana Legislature established a Legislative Oversight Committee and charged it to receive "briefings on the progress of the Montana-ARCO litigation...and to consider plans for appropriate utilization of any money received by the State as a result of the litigation." Periodically, the Committee meets with the staff of the Natural Resource Damage Program to exchange views and information. Although the Governor is the ultimate decision maker for recovered natural resource damages, the State values the oversight and assistance received from the Legislative Oversight Committee and believes it is appropriate to continue this relationship as the UCFRB restoration process proceeds. Accordingly, the State, through the NRDP, will consult with the Legislative Oversight Committee on the annual restoration work plans prior to their adoption.

PLANNING PROCEDURES

A. The Annual Cycle and Eligibility to Submit Project Proposals

A threshold issue in determining how best to restore the UCFRB's injured natural resources is whether the State of Montana, itself, should devise a single plan for restoration of the resources or whether, with the assistance of others, it should develop multiple restoration plans over a number of years. The State believes the preferable approach is to develop and fund annual restoration work plans based upon proposals for projects from a variety of governmental agencies, individuals, and private entities. This approach will:

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- Enhance decision making by allowing the State to compare projects with one another on an annual basis.
 - Facilitate administration and enable the State to better maintain control of the direction of the overall restoration effort.
 - Allow project proposals from a variety of sources, inside and outside of state government, providing a broader approach to restoration and a better mix of actions.
 - Encourage cost-efficiencies, as the State intends to encourage those submitting proposals to seek other sources of funding, including matching funds. (Leveraging the existing pool of restoration funds will maximize the benefits.)

In allowing individual members of the public, including for-profit and non-profit organizations, to propose and implement restoration projects, the State can tap into the considerable expertise of those who are not part of state government. The State recognizes that simply allowing for public comment on a restoration work plan already devised is not the same as giving members of the public and other governmental entities the opportunity to develop and implement projects which may become part of that plan.

Since the Natural Resource Damage Program will be spending its time reviewing proposed projects, making recommendations to the Trustee Restoration Council and otherwise administering the restoration program, the NRDP will not develop its own project proposals. However, when the NRDP believes that any specific restoration needs are not being met by projects being proposed by others, the NRDP with the approval of the Trustee Restoration Council, may issue requests for proposals (RFPs) to meet these restoration needs. The proposals that are submitted as a result of such RFPs shall be considered for funding like any other proposed restoration projects. Also, the NRDP may submit restoration planning and research proposals to the Trustee Restoration Council at any time it is deemed necessary or appropriate. Such proposals will be forwarded to the Advisory Council, which may make recommendations regarding such proposals.

B. Project Applications and Minimum Qualifications

Normally the State will begin accepting applications for restoration project funding at the beginning of each year and the deadline for submission of applications shall be March 1. The State's target date for making final project funding decisions and approving each annual restoration work plan is in December. This should allow work on the ground to begin during the construction season of the following year. This time table should provide sufficient lead time to review project proposals, consider and respond to public comment, including any

recommendations of the Advisory Council, the Tribes and DOI, prepare various drafts of the restoration work plan, and make a final decision on the plan. In addition it should give successful applicants sufficient time between notification of funding approval, and project start-up, to perform any necessary additional design work, line up contractors, and take other actions needed to begin the restoration work.

The level of detail required by an application will depend on the nature and cost of the project; applications for projects costing more than \$25,000 will be required to use the Long-Form UCFRB Restoration Grant Application, which calls for a fairly high level of detail. The Short-Form UCFRB Restoration Grant Application may be used for projects costing \$25,000 or less. The State will provide instructions on how to complete the applications, and the staff of the NRDP will be available to assist applicants and answer questions.

Prior to submitting an application for funding, an applicant should consult with the local governing body in the area where a project is proposed to avoid conflict with local work that may be planned or underway.

To assure that each proposed project meets the minimum qualifications for funding, the NRDP will conduct an initial application screening focused on the following items:

- That the application is completed fully and accurately, and contains all necessary information.
- That the proposed project would restore, rehabilitate, replace or acquire the equivalent of the natural resources injured or services lost as a result of releases of hazardous substances by ARCO or its predecessors that were the subject of Montana v. ARCO.
- That the proposed project would be located in the UCFRB. This requirement does not apply to: (1) research or education projects, provided that the proposed research or education pertains to restoration of natural resources located in the UCFRB; (2) a project, or a portion thereof, that would be located outside of the UCFRB but would have the effect of restoring or significantly facilitating the restoration of natural resources or lost services of the UCFRB; and (3) projects to restore native trout, provided such projects are located in the Big Blackfoot River Basin and there is a showing that it would be impractical or uneconomic to restore such trout in the UCFRB.
- That the applicant has the ability, financial wherewithal, and other qualifications necessary to undertake the proposed project. In determining whether an applicant is qualified, the cost and nature of the proposed project and the applicant's past experience

in handling similar projects will be considered. Also, credit and other background checks may be used in determining an applicant's fitness to proceed with the project.

- That consideration or implementation of the proposed project would not interfere, potentially interfere, overlap, or partially overlap with the State's remaining claims in the Montana v. Arco natural resource damage lawsuit, or with the State's proposed restoration determination plans for the three sites still involved in that litigation. Those sites are Butte Area One, Smelter Hill Area Uplands and the Upper Clark Fork River (see Chapter 2 for a more detailed description of these sites and the injured resources). The proposed project must not interfere with the restoration work that will occur at the Milltown NPL site that is covered by the joint remediation/restoration Consent Decree.

If the NRDP determines a project does not meet the minimum qualifications for funding, the applicant, within 15 days of receiving written notice of this determination, may appeal the determination to the Trustee Restoration Council. The Trustee Restoration Council has developed an appeal procedure that is available from the NRDP upon request.

The Program will contact applicants with questions or when applications contain minor mistakes or omissions. However, it will return applications that are substantially deficient, with an explanation of the deficiency. If necessary, and to the extent it is able, the NRDP will assist the applicant in addressing the deficiency. When the deficiency is corrected, the applicant may resubmit the application. If a substantially deficient application is not properly corrected and resubmitted prior to the application deadline, it may not be considered for funding until the following year.

Project Development Grants and Small Grant Projects Costing \$25,000 or less

A process separate from the annual restoration work plan process (highlighted in Figure 2) is available for project development grants and small grant projects. Typically, applicants must pay the costs they incur in developing a project proposal and then pursuing it through the application process. However, an applicant may submit a project development grant application for project development funding. Applications for project development grants and small grant projects costing \$25,000 or less may be submitted at any time. The applications will be reviewed by the NRDP, which will make recommendations to the Trustee Restoration Council, which shall make the final funding decisions on these applications. Such applications will also be forwarded to the Advisory Council, which may also make recommendations to the Trustee Restoration Council on these applications. Opportunities for public comment on the applications considered in this "off-cycle" process will be provided at the Advisory Council and Trustee Restoration Council meetings. Decisions on whether to fund project development grants and small grants will be made by

majority vote of the Trustee Restoration Council and will be based on an evaluation of the Stage 1 and 2 Criteria, set forth in Chapter 4. The total combined maximum annual funding for these “off-cycle” projects shall be limited to \$200,000. If this cap is reached in any calendar year, then prospective applicants desiring to use this process must wait for consideration until the subsequent year or submit their applications as part of the annual restoration work plan process. Applicants cannot use this off-cycle process to submit a series of small projects for funding that are really parts of a larger project or otherwise closely linked. Applications for project development grants or other projects costing over \$25,000 must be submitted according to the annual restoration work plan process.

Pre-Applications

Prospective applicants may also, at any time, submit “pre-applications” to the State in order to obtain a non-binding opinion from the Trustee Restoration Council on whether a particular conceptual proposal may be an appropriate project for funding out of the Restoration Fund. Such pre-applications will not be considered as part of the annual restoration work plan but will be considered separately on a continuing basis. (Note: The State’s consideration of pre-applications will have a lower priority than its consideration of applications for funding.) Pre-applications will be reviewed by the NRDP, which will make recommendations to the Trustee Restoration Council. Pre-applications will also be forwarded to the Advisory Council, which may also make recommendations to the Trustee Restoration Council.

C. Project Evaluation, Decision Making and the Restoration Work Plan

All applications which meet the minimum qualifications will be thoroughly reviewed and evaluated by the State. In doing so, the NRDP may seek assistance from state agencies, other governmental units, or private sector consultants, and shall consult and coordinate with the Department of Fish, Wildlife and Parks on all projects, which will affect fish or wildlife. The State, in evaluating the proposed projects, will apply the two sets of criteria, which are described in Chapter 4. Initially, each project will be evaluated using the criteria in isolation from the other proposed projects. The projects then will be compared to each other using the criteria. Based on the results of this comparative analysis, the NRDP will make recommendations on project funding to the Trustee Restoration Council.

In addition, as mentioned above, the UCFRB Advisory Council, EPA, the Tribes, and DOI will be afforded significant roles in restoration planning at various stages in the review and decision making process, beginning with the application evaluation stage. After the initial screening of applications to assure the minimum qualifications have been met, the NRDP will provide copies of all qualified project applications to these parties.

Subsequently, the State, through the NRDP, will meet with the Advisory Council, EPA, the Tribes and DOI, on an as-needed basis and at least once during the yearly application review cycle to discuss the proposed projects and share information necessary to permit meaningful consultation and comment. (If the Tribes and DOI wish, the meetings between them and the NRDP shall be separate from the meetings between the Advisory Council and the NRDP.)

As discussed in Chapter 1, CERCLA and the DOI regulations require that trustee decisions regarding restoration expenditures be embodied in a “restoration plan” and that the public have an opportunity to comment on that plan. To meet this requirement, the State will formalize its restoration funding decisions in an annual “Restoration Work Plan,” which will describe, analyze, and select projects for funding.

After the initial screening of all applications for project funding, the following steps will be followed each year:

- The NRDP will prepare a “pre-draft Restoration Work Plan” that contains its recommendations for funding, the reasons for its recommendations, and its Chapter 4 criteria analysis for all the proposals.
- NRDP will provide the pre-draft plan to the Advisory Council, EPA, the Tribes and DOI at least 30 days in advance of its submission to the Trustee Restoration Council.
- Those parties may meet with, discuss and/or submit comments on the pre-draft plan to the NRDP during the 30-day period.
- After considering the views of these parties, the NRDP will make appropriate revisions to the pre-draft Restoration Work Plan before submitting the plan to the Trustee Restoration Council for preliminary approval.
- The Trustee Restoration Council will consider the Program’s recommendations and the comments and recommendations of the Advisory Council, EPA, the Tribes, and DOI in making its preliminary decision on the work plan.
- Upon making that preliminary decision, the Trustee Restoration Council will give the NRDP direction on preparing a “draft Restoration Work Plan.”
- The draft Restoration Work Plan will then be released for a formal public comment period, as required by statute, of at least 30 days.

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- The NRDP will consider and respond to the public comments and prepare, in light of those comments, a proposed “final Restoration Work Plan” which shall be transmitted to the Trustee Restoration Council and also to the Advisory Council, EPA, the Tribes and DOI.
 - The Trustee Restoration Council will then make its final recommendation on the Restoration Work Plan to the Governor. In making this final recommendation, the Trustee Restoration Council shall consider the public comments as well as the recommendations of the Advisory Council, the Tribes, EPA and DOI.
 - The Governor will make the final decision on the Restoration Work Plan.

In making the final decision on the plan, the Governor shall consider the record that was before the Trustee Restoration Council at the time it made its final recommendation, including the public comment and the recommendations of the Advisory Council, EPA, DOI and the Tribes.

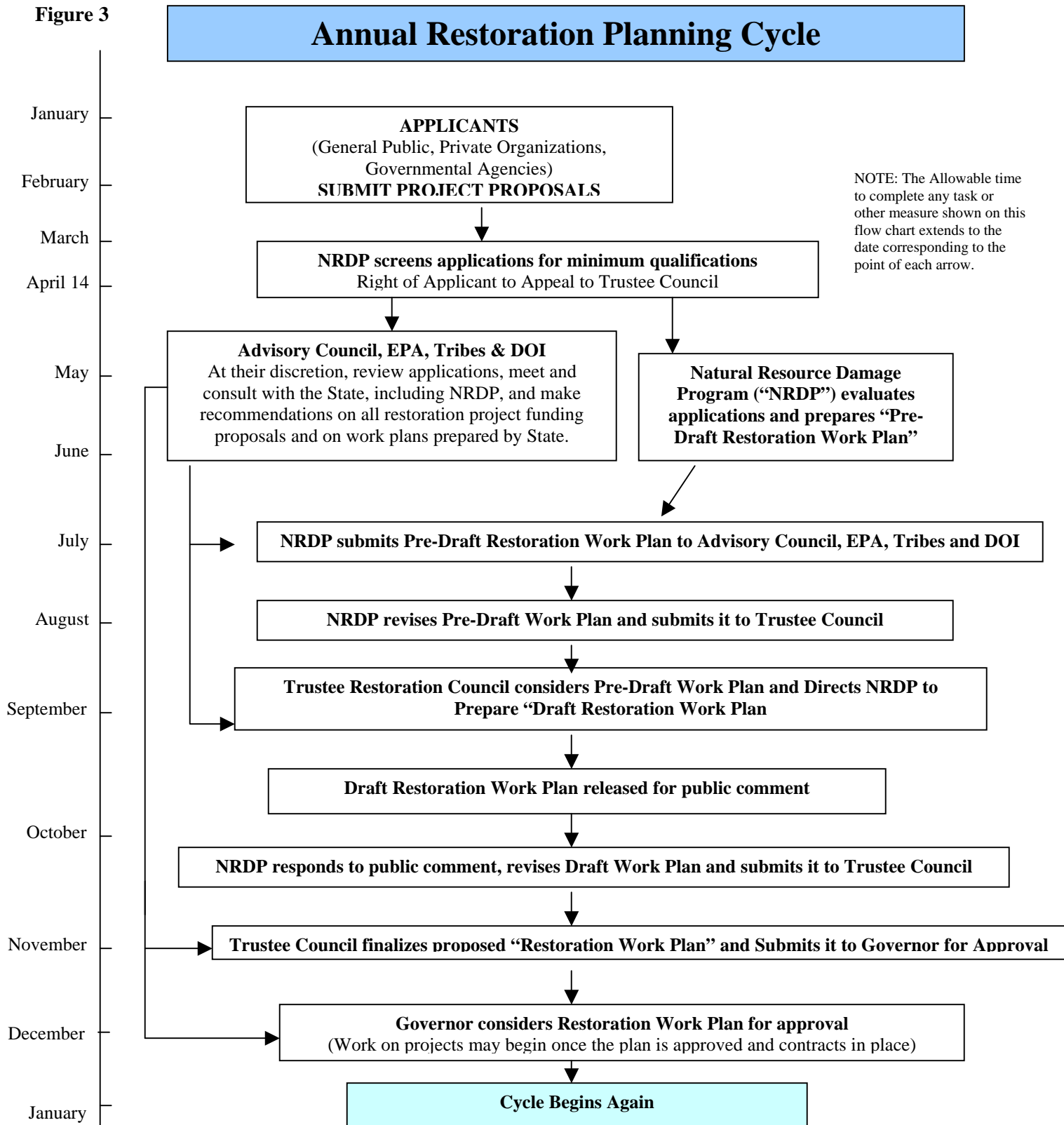
The annual decision making process that culminates with the issuance of the Restoration Work Plan is depicted in the flow chart shown in Figure 3. This process is, by necessity, somewhat complicated and involves the consideration of a wide array of issues, including diverse environmental factors. In addition, the public, as will be discussed in further detail below, has significant opportunities to participate in this process. Accordingly, as to most projects, issuance of an annual Restoration Work Plan and adherence to this document will fulfill the State’s obligations under the Montana Environmental Policy Act to consider the environmental effects of its actions.

PUBLIC PARTICIPATION

The process described above for making restoration funding decisions has been designed – with its numerous opportunities for public comment and involvement by the Advisory Council, the Tribes, DOI, and the Legislative Oversight Committee – to ensure that all viewpoints are considered to the fullest possible extent and to promote reasoned, measured deliberation on the part of the State. The State believes that establishing a sound decision-making process goes a long way toward ensuring sound decisions.

The State of Montana recognizes the importance of public input and participation in the restoration planning process. Not only does involving the public in restoration planning promote better decision making, it must be remembered that it was an injury to the public’s natural resources for which the State, and Governor serving as trustee, recovered natural resource damages.

Figure 3



With this in mind, the State has attempted to devise procedures that maximize opportunities for the public to express its views, influence the process, and submit proposals for restoration projects. There will be multiple opportunities for meaningful public participation at all points in the process:

- The UCFRB Advisory Council, which is intended to represent the public, is given a significant role in funding decisions.
- The Legislative Oversight Committee, made up of legislators who in turn represent constituents, also plays a role in the process.
- The public has the opportunity to submit proposals for restoration projects and to comment on the draft Restoration Work Plan before it is finalized.

The public will also have access to information pertaining to restoration planning and the overall restoration effort via the NRDP Internet site at www.doj.mt.gov (under “Montana Lands”). Included on the site will be draft and final Restoration Work Plans, status reports, and information related to that particular year’s funding cycle. Also, the State has established an electronic mailing address (nrdp@mt.gov) to enhance the public’s ability to communicate with the State.

PROJECT IMPLEMENTATION, FOLLOW-UP AND MONITORING

Projects will be implemented by the project applicant. The Natural Resource Damage Program will ensure that the project as implemented is consistent with the project as proposed and funded. Accordingly, prior to beginning construction, the applicant will be required to submit final design plans to the NRDP for review and concurrence that the proposed design is consistent with the approved proposal. The State shall have the authority to terminate project funding if it finds that the project is not consistent with the approved proposal.

The State also may require oversight and monitoring during project construction. This could occur in a number of ways, depending on the individual project. The NRDP could be responsible for oversight or for arranging for oversight; also the applicant could be required to arrange for oversight and/or progress reports. Monitoring will be useful in determining whether a project is being implemented as it was approved, and in assessing the efficacy of projects, evaluating the condition of resources and devising future restoration strategies. A project may need to be modified or adaptively managed in response to monitoring results.

The MOA between the State, Tribes, and DOI contains provisions relating to project implementation. If Tribal Cultural Resources are discovered during implementation of a project, work shall cease and the Tribal Preservation Officer consulted. A rapid consultation process created by the MOA then ensues. If the Tribes end up objecting to the State's decision, they may initiate the dispute resolution process involving the State Historic Preservation Officer (SHPO). The MOA, however, provides that after considering the recommendations of the SHPO, the State's decisions regarding the matter "shall be final."

If the Governor approves a project, the applicant must enter into a grant agreement with NRDP before any funds can be expended or received. Detailed scopes of works and budgets are required in all agreements, and must be approved by NRDP before work that will be paid by Restoration funds begins on the project. Expenses incurred before the grant agreement becomes effective will not be reimbursed.

Generally, project funding will be disbursed by the State, through the NRDP, after it receives properly documented invoices for previously authorized work. Funding may also be disbursed by the State after construction has been completed in order to monitor the results of the restoration action. The project applicant is responsible for providing the NRDP with a proper accounting of expenditures for each time period in which funding is disbursed. If the accounting reveals an impropriety, the State has the right to terminate project funding and require the return of the funds expended.

Applicants must obtain all necessary permits and work authorizations. In addition, all contracts funded through this process must comply with the State's contracting and procurement laws. Construction contracts will be subject to the State's standard general conditions and appropriate supplementary conditions. Furthermore, by funding projects, the State is not assuming any liability associated with the projects and project applicants are responsible for ensuring that projects are performed as specified and within budget. To ensure this, the State may require performance and payment bonds and various forms of insurance.

The State will publish annual reports generally describing the restoration program and the prior year's activities. This will give both planners and the public up-to-date information on restoration projects and their accomplishments. In addition, periodic financial reports will be produced to track and evaluate the financial performance of the restoration program as a whole.

CHAPTER 4

CRITERIA FOR DECISION MAKING



Chapter 4

CRITERIA FOR DECISION MAKING

This chapter identifies and discusses the criteria that the State will use to make restoration funding decisions and prepare its annual work plans. The criteria are grouped into two sets reflecting their derivation from two different sources: Legal and policy. The “Stage 1 Criteria” are derived primarily from the criteria set forth in DOI’s natural resource damage assessment regulations, which trustees are to use when selecting restoration projects. The Stage 1 Criteria also include a criterion reflecting the additional factors the State is to consider under the MOA with the Tribes and DOI. The “Stage 2 Criteria” have been developed by the State of Montana to reflect matters of special interest to the State and to promote the State’s goals and policies.

In applying these criteria to evaluate proposed restoration projects, the criteria will not (and cannot in any meaningful sense) be rated in importance or assigned numeric values which would otherwise allow projects to be graded numerically. While each Stage 1 and Stage 2 criterion is important, each criterion as applied to individual projects, will vary in its importance depending upon the nature of the project and the unique issues it raises. Given the widespread injury to natural resources in the UCFRB and the wide array of potential restoration projects, the State must not be unduly constrained in its ability to evaluate what is best for the injured resources. A non-quantitative process in which the criteria and the proposed projects are balanced and ranked against each other allows the State greater flexibility to address natural resource injuries and impaired services.

The State does note that while no particular criterion is necessarily weighted more heavily than any other, a single criterion could be the deciding factor as to whether a project is approved or disapproved depending on the circumstances. For example, one of the criteria listed below is an evaluation of the project’s effects on human health and safety; if a project posed a significant threat of bodily harm to workers or the public, it is likely that the project would be disapproved on this ground alone, irrespective of any other benefits accruing from the project.

STAGE 1 CRITERIA: REQUIRED BY LEGAL CONSIDERATIONS

The Stage 1 Criteria are as follows:

Technical Feasibility: The State will evaluate the degree to which a project employs well-known and accepted technologies and the likelihood that a project will achieve its objectives. Obviously, projects that are technologically infeasible will be rejected. However, the State may approve projects that are innovative or that have some element of

uncertainty as to their results. Different projects will use different methodologies with varying degrees of feasibility. Accordingly, application of this criterion will focus on an evaluation of a project's relative technological feasibility.

Relationship of Expected Costs to Expected Benefits: The State will examine whether a project's costs are commensurate with the benefits it provides. In doing so, the State will need to determine the costs associated with a project, including costs other than those needed simply to implement the project, and the benefits that would result from a project. Application of this criterion is not a straight cost/benefit analysis, nor does it establish a cost-benefit ratio that is by definition unacceptable. While it is possible to quantify costs, quantifying benefits is more difficult. Requiring projects to meet some established cost-benefit ratio would likely result in the rejection of many worthwhile projects because of the difficulty in quantifying the benefits to resources and services flowing from the implementation of the projects.

Cost-effectiveness: The State will evaluate whether a particular project accomplishes its goal in the least costly way possible. To apply this criterion in a meaningful fashion, the State must consider all the benefits – not just cost – a project would produce; otherwise the focus would be too narrow. A simple example of this is one project that would fully restore a given resource in a short period of time and another project that would restore the same resource at less cost but over a longer period of time. Considering only that the second project is less expensive than the first project ignores the benefits resulting from a relatively shorter recovery period. In this example, since an accelerated recovery time is a benefit, this would need to be factored in to a determination of cost-effectiveness.

Results of Response Actions: The State will consider the results or anticipated results of response actions underway, or anticipated, in the Upper Clark Fork River Basin. Numerous response actions are ongoing and additional response actions are scheduled to begin in the next several years, continuing for many years into the future. Application of this criterion will require the State to assess at an adequate level of detail, given the inherent uncertainties associated with this task, what response actions will entail and to make projections as to their effects on resources and services. Consideration of response actions will occur in two principal contexts:

- The State will evaluate what is necessary in the way of restoration of resources and services in light of the ongoing and planned response actions. Doing this will enable the State to conduct restoration planning on an integrated basis, which is a Stage 2 Criteria.

- The State will evaluate the degree of consistency between a project and a response action looking at whether a project builds on a response action or, at the other end of the spectrum, seeks to undo a response action. The State will tend to favor those projects that do the former as opposed to the latter.

Adverse Environmental Impacts: The State will weigh whether, and to what degree, a project will result in adverse environmental impacts. Specifically, the State will evaluate significant adverse impacts, which could arise from a project, short term or long term, direct or indirect, including those that involve resources that are not the focus of the project. To do so, the State must understand the dynamics of a project and how that project will interact with the environment.

Recovery Period and Potential for Natural Recovery: The State will evaluate the merits of a project in light of whether the resource is able to recover naturally and, if a resource can recover naturally (i.e., without human intervention), how long that will take. This will place a project's benefits in perspective by comparing the length of time it will take for the resource to recover if the project were implemented, with the length of time for natural recovery. (By the use of the term "recovery," the State is referring to the time it will take an injured natural resource to recover to its "baseline," i.e., pre-injury condition.) If a resource will not recover without some action or if natural recovery will take a long time, a restoration action may very well be justified. Conversely, if a resource is expected to recover on its own in a short period of time, a restoration action may not be justified.

Human Health and Safety: The State will evaluate the potential for a project to have adverse effects on human health and safety. The State will undertake such a review not only to judge a particular project but also to determine if protective measures should be added to the project to ensure safety.

Federal, State, and Tribal Policies, Rules and Laws: The State will consider the degree to which a project is consistent with applicable policies of the State of Montana and applicable policies of the federal government and Tribes (to the extent the State is aware of those policies and believes them to be applicable and meritorious). In addition, projects must be implemented in compliance with applicable laws and rules, including the consent decrees and this *Restoration Plan Procedures and Criteria*.

Resources of Special Interest to the Tribes and DOI: Pursuant to the MOA, the State is to pay particular attention to natural resources of special interest to the Tribes and/or DOI, including attention to natural resources of special environmental, recreational, commercial, cultural, historic, or religious significance to either the Tribes or the United States. The

MOA also provides for the State to pay particular attention to “Tribal Cultural Resources” or “Tribal Religious Sites,” as those terms are defined in the MOA.

STAGE 2 CRITERIA: REFLECTING MONTANA POLICIES

The Stage 2 Criteria follow, grouped into three categories: General Policy Criteria, Land Acquisition Criteria, and Monitoring and Research Criteria.

General Policy Criteria

Project Location: This criterion focuses on the location of the project and the area that will benefit from the project. While the State recovered natural resource damages on behalf of all its citizens, restoration projects are to be located in the Upper Clark Fork River Basin. The rationale for this requirement follows from the natural resources damage provisions of CERCLA and CECRA. By allowing trustees to recover damages to undertake restoration actions to redress natural resources injuries, the statutes create a direct relationship between those actions and the specific natural resources that have been injured. One of the most important elements of this relationship is geographic, requiring ordinarily that restoration actions occur at or near the site of the injury. In addition, this is a matter of fundamental fairness. The people of the UCFRB have lost the most as a result of the injuries to natural resources and services. Accordingly, they should receive most of the benefits from actions to improve the condition of injured resources and services. The only exception to this geographic requirement would apply to projects, which are intended to restore native trout, which have been injured or impaired in the UCFRB, but which cannot, from a practical or economic standpoint, be restored in the UCFRB; such projects may be located in the Big Blackfoot River watershed. Except for restoration work approved in proximity of the Milltown Dam site, no work in the Big Blackfoot River watershed will be considered until there is scientific determination that efforts to restore native trout restoration in the UCFRB would be uneconomical or impractical. This could be well after implementation of the response actions along the Clark Fork River.

Actual Restoration of Injured Resources: This criterion will examine whether and to what extent a project actually restores injured resources. In order to return the injured resources to productive use and make them available to future generations of Montanans, the State believes that the actual restoration of the resources that were injured should be given priority. That said, the State must note that no illusions should exist about what can practically be accomplished in the UCFRB. Full restoration is unlikely to occur in this generation given the limited restoration funds, the type and pervasiveness of contamination, and the magnitude of the injuries to the natural resources. Also, in its 1995 Restoration

Determination Plan, the State recognized that some injured resources could not be restored for many thousands to tens of thousands of years, if at all, due to technical impracticability considerations.

Relationship Between Service Loss and Service Restoration: Under this criterion the State will examine the connection between the services that a project seeks to address and the services lost or impaired as a result of the injuries to natural resources for which the State recovered damages. Proposed restoration projects that closely link the services that are a project's focus with the service flows that have been impaired will be favored over projects that do not.

Public Access: Under this criterion the State will examine whether public access is created or enhanced by a project. Public access issues – both the positive and the negative aspects – will be considered in funding decisions. Public access is not required of every project, nor is it relevant to all projects. Also, public access may not always be desirable from a resource protection standpoint, such as when public access to newly restored areas needs to be restricted to successfully establish vegetation. In many circumstances, however, providing public access may enhance the project's public benefits and, in some circumstances, public access may be essential.

Ecosystem Considerations: Under this criterion the State will examine the relationship between a particular project and overall resource conditions in the Upper Clark Fork River Basin. The UCFRB is a complex arrangement of interdependent components. To accomplish as much as possible, the State will view projects in the context of this complex system, attempting to understand the impact of a project on the ecosystem as a whole. The State will favor projects that fit within a broad ecosystem concept in that they improve a resource problem(s) when viewed on a large scale, are sequenced properly from a watershed management approach, and are likely to address multiple resource problems. Under this criterion, for proposed projects located within the Silver Bow Creek watershed, the State will also evaluate the consistency of a proposed project with the watershed-scale priorities established in the *Silver Bow Creek Watershed Restoration Plan*.

Coordination and Integration: Under this criterion the State will consider whether, how, and to what extent a restoration project is coordinated or integrated with other ongoing or planned actions in the UCFRB, in addition to the coordination with EPA response actions that is separately addressed under the "Results of Response Actions" criterion. Restoration projects that can be efficiently coordinated with other actions may achieve cost savings. Moreover, not viewing projects in isolation will allow the State to take advantage of synergistic effects that produce benefits disproportionate to the costs of a particular project.

Public Support: With this criterion, the State must assess whether a project has public support. While the public may influence the process in a variety of ways, the State deems it advisable to explicitly acknowledge the important role the public will play in decision-making. This criterion is that acknowledgment.

Matching Funds and Cost Sharing: The State will consider whether and to what degree a project, or the selected portion of a project proposed for restoration funding, has funding from another source. Leveraging the recovered natural resource damages produces obvious efficiencies.

Normal Government Functions: The State, through this restoration program, will not fund activities for which a governmental agency would normally be responsible or that would receive funding in the normal course of events. With this criterion the State will evaluate whether a particular project (including acquisitions, monitoring, and research) would be implemented if recovered natural resource damages were not available. The Restoration Fund may be used to augment funds normally available to government agencies to perform a particular project if such cost sharing would result in the implementation of a restoration project that would not otherwise occur through normal agency function.

Property Acquisition Criteria

The following criteria, in addition to the above Stage 1 and Stage 2 General Policy Criteria, are applicable to proposed property acquisitions:

Desirability of Public Ownership: This criterion requires the State to assess the potential benefits and detriments associated with putting privately owned land, or interests in land (including conservation easements and water rights), under public ownership. Although the State has established a policy that favors actions that actually improve the condition of injured resources and services, land acquisition may be an appropriate replacement alternative.

Price: The State will evaluate whether the land, easements or other property interests proposed to be acquired are being offered for sale at fair market value. Consideration of this criterion will likely require the State to conduct its own appraisal of the property.

Monitoring and Research Criteria

The following criteria, in addition to the above Stage 1 and Stage 2 General Criteria, are applicable to monitoring and research projects, except the “Project Location” criterion shall not apply to research projects, provided the proposed research pertains to restoration of injured natural resources in the UCFRB. These criteria apply to any research activity, whether or not it constitutes the entire project or a portion of the project. These criteria also apply to projects for which monitoring is a significant focus of the project, but not to projects that simply have a monitoring component tied to judging the project’s effectiveness.

Overall Scientific Program: This criterion will be used to evaluate whether a monitoring or research project is coordinated or integrated with other scientific work in the Upper Clark Fork River Basin. Greater benefits can be achieved when monitoring and research projects can use and assist other projects.

Assistance With Restoration Planning: Under this criterion the State will consider whether the information sought, or knowledge that might be gained, by a monitoring or research project will directly assist with future restoration efforts.

CHAPTER 5

TYPES OF ELIGIBLE RESTORATION ACTIONS



Chapter 5

TYPES OF ELIGIBLE RESTORATION ACTIONS

This chapter discusses, in general terms, the various types of projects and actions that the State may fund with the recovered damages. As noted previously, under CERCLA such damages must be used to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources. It should also be noted that natural resources provide services to human beings and to other resources; thus, restoration actions that focus on services are legitimate candidates for funding – though not without limitation.

For purposes of discussion, the projects and activities on which recovered natural resource damages may be expended can be broken into three classes:

- Restoration, Rehabilitation, Replacement and Acquisition
- Education, Monitoring and Scientific Research
- Administration

The first class of activities is obviously the most significant. Most of the expenditures will be made for actions that constitute restoration, rehabilitation, replacement, and/or acquisition of equivalent resources. The State emphasizes that while monitoring, scientific research and administration are grouped separately from restoration actions, they are a component of such actions, or enable such actions to occur.

RESTORATION, REHABILITATION, REPLACEMENT AND ACQUISITION

This section is intended to help applicants identify the types of actions that constitute restoration, rehabilitation, replacement and/or acquisition of equivalent resources.

Restoration: Actions constituting “restoration” operate directly on the injured resources and services, to return them to baseline conditions or to accelerate the recovery process. For example, in a situation where numerous sources are contaminating groundwater, removing the most significant sources would lessen the injury and result in the groundwater’s recovery, or “restoration” to baseline sooner than would otherwise occur.

Rehabilitation: Actions constituting “rehabilitation” attempt to return the injured resources and services to a state different than their baseline condition but still beneficial to the environment and the public. For example, where injury to a conifer forest resulted in a loss of upland big game habitat, planting grasses and shrubs would create upland bird habitat. Restoration and rehabilitation actions are resource oriented, seeking to produce

tangible improvements in the condition of the injured resource. At least three different methodologies may accomplish this result:

- Actions that remove, reduce, or control the source of the contamination causing injury. (In its *Restoration Determination Plan* (October 1995), the State favored this methodology.) For example, the removal of tailings that contain hazardous substances from riparian ecosystems would produce benefits both to the riparian environment, by allowing for revegetation of the floodplain, and to the waterway, itself, by preventing hazardous substances from reaching the waterway. Similarly, the removal of tailings causing groundwater contamination would prevent or reduce further groundwater contamination. Other strategies to control the source of the contamination take a more indirect approach. For example, a trench or a variety of interceptor wells may collect contaminated groundwater, which is then treated to remove the substances causing the contamination. Or contaminated soil that is affecting vegetation may be covered with clean soil to induce vegetative growth and prevent erosion.
- Actions that directly manipulate the environment to achieve a desired goal. For example, in rivers and streams that are physically degraded and contain depressed fish populations, reconstructing the stream channel to create over-hanging banks and pools would provide beneficial cover and habitat for the fish. If stream dewatering was impacting fish numbers in a particular stream, obtaining additional water and ensuring that it stays in the stream might allow for adequate flows at all times and benefit the fishery. Similarly, if wildlife habitat has been compromised, planting trees and shrubs would enable the reintroduction of some level of beneficial habitat. In addition, establishing structures for wildlife, such as nesting boxes, might benefit wildlife. Relocation or reintroduction of wildlife to a particular area might also be useful.
- The use of management techniques. Managing natural resources to limit human use or impose other restrictions may create conditions favorable to the recovery of the resource. Examples include closing an area to hunting or fishing, redirecting hunting and fishing access points, keeping livestock out of riparian zones, comprehensive weed management, revegetative practices, grazing management systems, and irrigation water management techniques. While some management tools may be outside the authority of the entity proposing them to impose, the State may recommend to the appropriate authorities that the management tool be adopted.

Replacement: Actions constituting “replacement” seek to create or enhance resources and services equivalent or very similar to those that have been injured but away from the immediate site of the injury. For example, where an injury to a trout fishery has occurred,

improvements to a nearby stream would enhance its trout fishery and would, in effect, constitute a “replacement” of the injured fishery.

Acquisition of Equivalent Resources: Actions constituting “acquisition of equivalent resources” involve acquiring unimpaired resources comparable to those that are injured. Acquisition of equivalent resources can hasten recovery or protect the injured natural resources. For example, acquiring healthy land adjacent to injured land can relieve pressure on the injured land and hasten its recovery. Or acquisition of equivalent resources may compensate the public for its diminished ability to use the injured resources. For example, although acquiring unimpaired land for public use does not restore the land that has been injured, it does make other land available for public use.

Replacement and acquisition actions can be valuable tools for mitigating natural resource injury. Most commonly, they focus on the return of lost services. For example, in a situation where land has been injured and no longer provides public hunting opportunities, the acquisition of unimpaired land that is presently not open for hunting would return the lost service of hunting. In the case where injured natural resources are unable to provide habitat for wildlife, the acquisition of unimpaired land that currently affords wildlife habitat but that will be developed in the future would compensate for a prospective loss of services. In these examples, the action does not seek to restore or rehabilitate the actual natural resources that are injured but, instead, replaces the injured resources or acquires other natural resources in order to return lost services.

Replacement and acquisition actions can also work to restore and rehabilitate natural resources while at the same time returning lost services. Thus, in a situation where recreational fishing opportunities on a mainstem river are lost, acquiring riparian land and access points along a relatively unimpaired tributary would return a measure of the lost recreational fishing opportunities. In addition, acquiring riparian land and implementing appropriate land management measures might reduce the amount of sedimentation into the tributary and, ultimately, the mainstem, thus restoring and rehabilitating the injured river.

Replacement and acquisition actions also may concern more than one service. Thus, acquiring land that presently provides wildlife habitat but is closed to hunting both ensures that it continues to function as wildlife habitat and creates opportunities for hunting. So too, the acquisition of an upland watershed may provide wildlife habitat and may also ensure the delivery of clean water down stream, either in the form of groundwater or surface water, that can be used in a variety of ways.

Numerous other hypothetical replacement and acquisition actions can be imagined. In a situation where there has been a groundwater injury, it might be advisable to acquire land

and water so as to allow for the construction of a reservoir that would supply drinking water needs. Or, in a situation where there has been a loss of recreational opportunities generally, it might be worthwhile to improve existing recreational facilities such as trails, boat ramps, and campgrounds. If wetlands have been injured, an equivalent sized wetland with characteristics similar to the injured wetland prior to its injury could be acquired, enhanced and/or created.

Finally, a complete match may not occur between the services that were lost and the services being acquired or replaced. A loss of recreational boating at a site may be replaced with riparian enhancements at the site to enable additional bird-watching opportunities. Or, upland wildlife habitat could be acquired or enhanced to replace an injured riparian habitat.

Limitations: It should not be inferred from the above discussion that any action that arguably restores or replaces natural resources or their service would be allowable. Some actions may be worthwhile and appealing but could not legitimately be funded with the natural resource damages recovered in Montana v. ARCO. Accordingly, “off-site” restoration projects should be limited to locations within the nearby vicinity of the injured resources except in instances where the injured resources cannot, from a practical or economic standpoint, be restored at such nearby locations. Similarly, “not-in-kind” restoration projects should be limited to the restoration of resources or services that provide very similar resources or services as the injured resource once provided. Given the variety of possible restoration projects and the need to maintain flexibility, the State declines to specify in greater detail what would or would not be permissible. The trustee will need to make decisions regarding such projects on a case-by-case basis, guided by the criteria and constrained by applicable law. In all instances, the trustee will recognize that he or she must act on behalf of the public by ensuring that the State’s natural resources are available for future generations of Montanans.

EDUCATION, MONITORING AND SCIENTIFIC RESEARCH

The Restoration Fund may be used for educational efforts that specifically pertain to the natural resources or services that were the subject of Montana v. ARCO or to acceptable replacements of those resources or services. Educating the public, including school children, about restoration can enhance public stewardship of natural resources. Enhanced stewardship will foster protection of restored resources and thereby contribute to effective restoration in the long-term. Education projects may also involve collection of monitoring data that can augment the State’s restoration monitoring efforts.

The Advisory Council has a major educational role as communicated in the executive order that established the Council:

“The primary purpose of the Advisory Council is to promote public understanding of the State’s efforts to remediate and restore sites in the UCFRB that have been injured by hazardous substance for which ARCO is liable.”

Because they can provide information that the State may use to make “informed” restoration funding decisions, monitoring and scientific research are also permissible uses of recovered natural resource damages. Information of value might include the status and condition of natural resources, such as whether natural resources are recovering, whether prior actions have improved the condition of the injured resources, and whether there are any constraints on recovery.

Decisions about the use of recovered natural resource damages must be informed to the fullest possible extent and based on what is reasonable under the circumstances. A lack of information may result in a misdirection of efforts. More, or better, knowledge may permit the State to target particular resources or to use techniques that would maximize recovery. A lack of information, or inadequate information, may also lead to ill-advised management decisions. Acting without a sufficient base of understanding, managers may take actions that inadvertently reduce the productivity and health of a resource or unnecessarily limit uses of the resource.

Monitoring: Monitoring tracks the condition of a natural resource over time. It can provide valuable information in determining how best to address a natural resource injury. For example, a groundwater collection and treatment system may have been installed as a result of a funded restoration action. Monitoring this groundwater can enable the State and others to assess whether any additional measures are advisable. Similarly, an action might call for long-term revegetation of an area. Monitoring of the ongoing effort might determine that a particular technique was or was not working and so allow for modifications to the effort. Some monitoring, at some level, will typically be a component of all funded projects. The type and level of monitoring will be project specific. The intensiveness of monitoring can range from a requirement of annual photographs to data collection and analysis.

Scientific Research: Scientific research, undertaken more generally and not tied to a particular action, can also provide valuable information to the State. Understanding the natural processes at work in the environment and how those natural processes have been disturbed by the release of hazardous substances will facilitate better decision-making and further efforts to mitigate natural resource injury. Obviously, a better understanding of the Upper Clark Fork River Basin’s natural resources will provide benefits to a program that is focused on improving the condition of those resources.

ADMINISTRATION

Expenditures of recovered natural resource damages can also be made for administrative purposes including, in appropriate instances: obtaining independent scientific review; reviewing project applications; preparing an annual Restoration Work Plan; contracting and project oversight; overseeing and evaluating monitoring results; restoration research and planning; financial audits; and providing for the participation of the Advisory Council and other public involvement. The administrative expenses that will be incurred by the State are necessary in order for the State to fulfill its responsibilities with respect to the expenditure of recovered natural resource damages. The State will endeavor to minimize these expenses.